

COMMERCIAL FERTILIZER

CONSOLIDATED
WITH THE
FERTILIZER
GREEN
BOOK



Extra Nitrogen means Extra Grazing!

NITROGEN is the plant food element that makes grass grow! That's why it pays to make sure that pasture improvement plans include plenty of nitrogen.

When abundant nitrogen is used in a balanced fertilizer program, pastures produce a vigorous growth of good green grazing which supplies low-cost, nutritious, high-protein forage that can be harvested by livestock.

Well-fertilized pastures increase livestock profits with bigger yields of better quality grazing and more grazing days. Dairy cows produce more milk. Beef animals fatten

quickly. Less barn feeding is required. Labor and feed costs are greatly reduced.

Here is a recommended pasture fertilization program, whether you are seeding new pastures—or improving established pastures:

1 *In the late summer or early fall, use a heavy application of high-nitrogen complete fertilizer.*

2 *Follow this with nitrogen top-dressing in the late fall and again very early in the spring. Top-dress with 100 to 200 pounds per acre of AR-CADIAN*, the American Nitrate of Soda, or A-N-L* Nitrogen Fertilizer.*

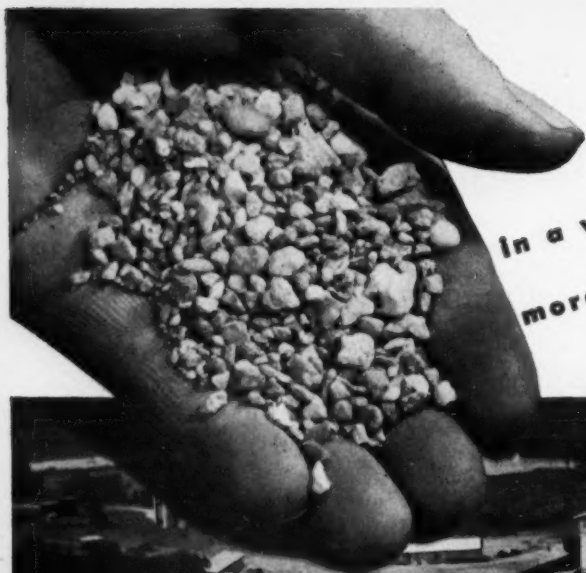
Watch this program make grazing crops get up and grow! Remember, it pays to use plenty of nitrogen on pastures. Extra nitrogen means extra grazing!

*Reg. U. S. Pat. Off.

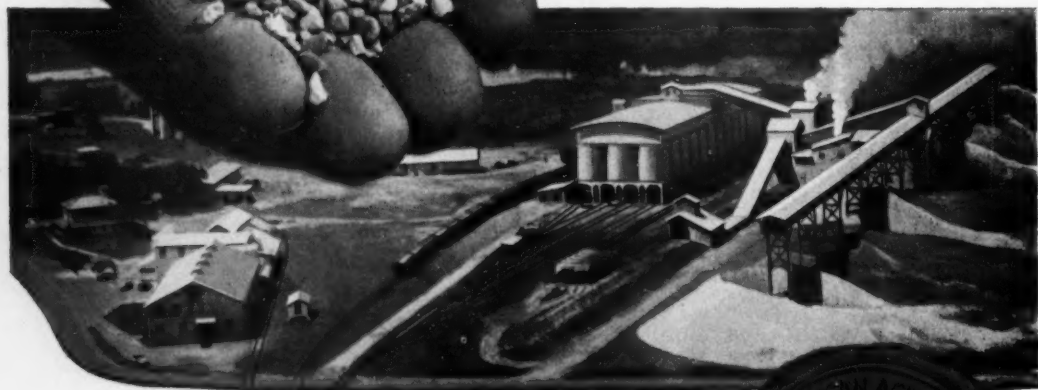
Nitrogen Division
ALLIED CHEMICAL & DYE CORPORATION

New York 6, N.Y. • Richmond 19, Va. • Hopewell, Va. • Columbia 1, S.C. • Atlanta 3, Ga. • South Plain, Ohio • San Francisco 3, Cal.

AUGUST, 1952



*In a way...
more precious than gold!*



Air view showing dryers and rock storage at Pierce, Florida, headquarters of A.A.C. phosphate mining operations. (Top) Sample of Florida Pebble Phosphate Rock, source of phosphorus widely used in the chemical industries, in its elemental form as well as in phosphoric acid, phosphates and phosphorus compounds. **Q** This pebble rock is also the principal source of the most important—and most generally deficient—plant food element. Often called the Key to Life, phosphorus is essential in maintaining and improving crop yields. Health, growth, life itself, would be impossible without phosphorus . . . so in a way these phosphate pebbles are more precious than gold.



AA Quality...

for over 85 years a symbol of quality and reliability

principal AA QUALITY products

All grades of Florida Pebble Phosphate Rock	AA QUALITY Ground Phosphate Rock
All grades of Complete Fertilizers	Superphosphate
Gelatin	Bone Products
Salt Cake	Ammonium Carbonate
Sulphuric Acid	Fluosilicates
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Phosphoric Acid and Phosphates	Phosphorus and Compounds of Phosphorus

THE AMERICAN AGRICULTURAL CHEMICAL COMPANY

GENERAL OFFICE: 50 CHURCH STREET, NEW YORK 7, N. Y.

30 FACTORIES AND SALES OFFICES, SERVING U. S., CANADA AND CUBA—ASSURE DEPENDABLE SERVICE

COMPLETE SERVICE



**LION PROVIDES DEPENDABLE ONE-STOP
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LION ANHYDROUS AMMONIA—For formulation. A uniformly high-quality basic product. Nitrogen content, 82.25%.

LION AQUA AMMONIA—For formulation or acid oxidation. Ammonia content about 30%. Other grades to suit you.

LION NITROGEN FERTILIZER SOLUTIONS—For formulation. Three types to suit varying weather and manufacturing conditions.

LION AMMONIUM NITRATE FERTILIZER—For direct application or formulation. Improved spherical pellets. Guaranteed 33.5% nitrogen.

LION SULPHATE OF AMMONIA—For direct application or formulation. Large free-flowing crystals. Guaranteed nitrogen content, 21%.

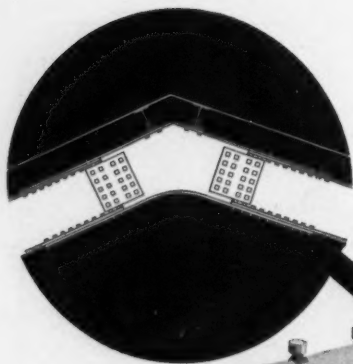


Serving Southern States

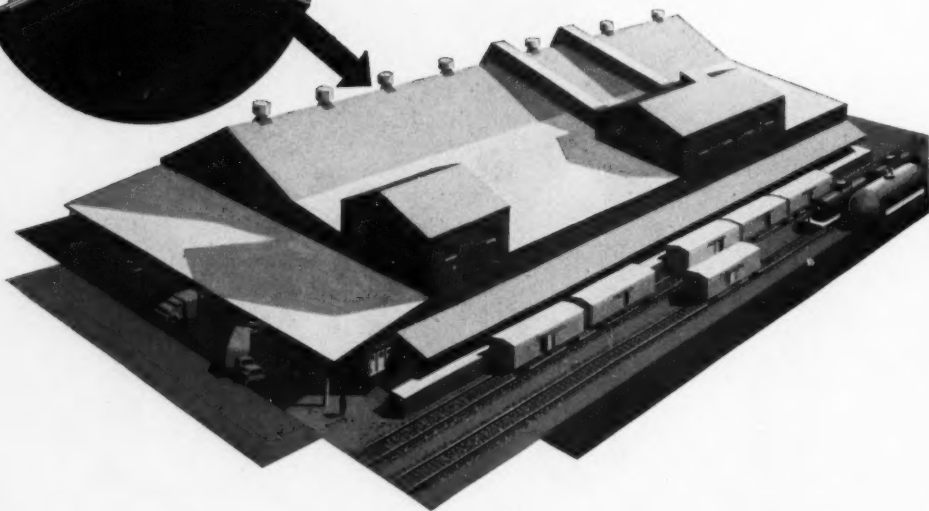
Lion provides special technical assistance for fertilizer manufacturers. Write us if you have a formulation problem.

LION OIL COMPANY

CHEMICAL DIVISION, EL DORADO, ARK.



McCloskey Fertilizer Plants are Designed and Built to Resist Corrosion



Resistance to corrosion is one of the important factors taken into consideration when McCloskey designs and builds your fertilizer plant. Substantial and compact sections are provided for the frame which is readily protected with acid resistant coatings to insure long life and low maintenance.

Other design advantages include greater resistance to damage than wood

frame or light, space consuming truss construction. The danger of fire loss is eliminated. Clear overhead is provided for conveyor systems, high stacking of material, and the need for eccentric profiles in fertilizer manufacturer are all engineered into your building by McCloskey. Before you plan a new plant ask McCloskey to give you the benefit of their many years of experience in this field. We will save you time and money.

McCloskey Company of Pittsburgh

Engineers and Builders

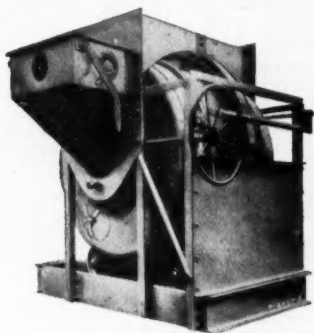
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COMMERCIAL FERTILIZER



He can't stand that slow mixing cycle!



WORTHINGTON DRUM-TYPE FERTILIZER MIXER, one of the complete Worthington line of industrial mixers of all kinds that incorporate features and advantages brought about during nearly a century of experience in mixer design. Standard sizes of fertilizer mixers, $\frac{1}{2}$, 1, 2, 3-ton capacity.



Wait! Our way is easier! It's a mixer that can boost your daily output as much as 10 per cent—the *Worthington fertilizer mixer*. Secret of the fast mixing action is Worthington's engineered blade design which gives the fastest mixing cycle we know of. You save time with every batch. Mixing is thorough, too, and special mixer design is such that it eliminates these other big problems for you:

THE CORRODED DISCHARGE CHUTE—The Worthington discharge chute is out of the mixer during mixing time. Proper balance makes manual control of chute easy. Pneumatic controls also available.

THE WOBBLY DRUM ROLLER—Worthington drum rollers are of genuine carwheel metal, ground to exact diameter. Compensation for wear to permit perfect centering is accomplished by easy adjustment of drum-roller shafts.

THE HEAVY HORSEPOWER CONSUMER—Worthington's clean, anti-friction construction with specially designed parts assures minimum possible horsepower consumption.

YR. 2.4

SEND THIS COUPON TODAY to learn more about how to reduce mixing time with a Worthington fertilizer mixer.

Worthington Corporation
Industrial Mixer Division, Plainfield, New Jersey

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POSITION.....

ADDRESS.....

CITY.....ZONE.....STATE.....

COMMERCIAL FERTILIZER

ESTABLISHED 1910

August, 1952

Vol. 85 No. 2

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Phone Harrison 7-3655

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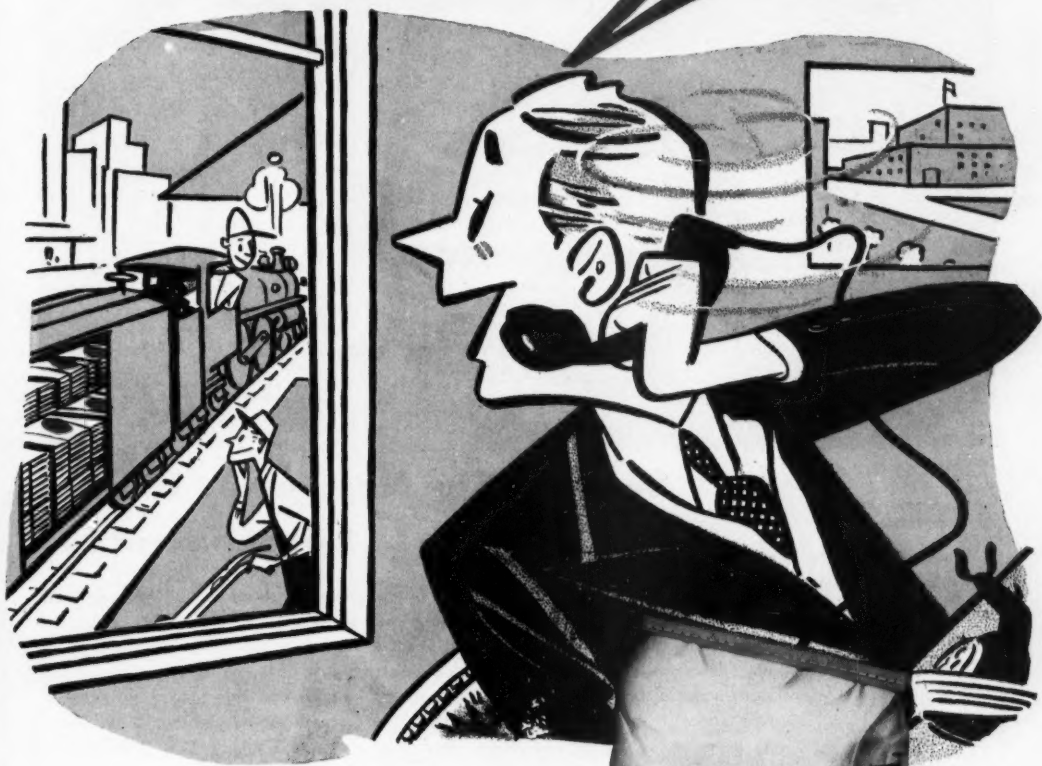
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HELLO...BEMIS? I WANT TO ORDER A CARLOAD
OF MULTIWALLS. WHEN DO YOU THINK...OH!
HERE THEY ARE! WHAT TOOK YOU SO LONG?



Don't pin us down to that, please.
But, no fooling, the twelve Bemis
multiwall plants, strategically
located coast to coast, mean that
at least one is conveniently close
to you. This time-saving means
money-saving. Ask your Bemis
Man for details.

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Model #1302-R in a
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COMMERCIAL FERTILIZER

Sulphur



Molten Sulphur flowing into the storage vat

*Thousands of tons mined daily,
but where does it all go?*



Look around you in any grocery store and what do you see — canned goods of all kinds! Soups, vegetables, fruits, berries! Believe it or not, you're looking at merchandise that consumed a lot of Sulphur in the making.

Tin cans are made of tin plate. Tin plate is made of sheet steel. Sheet steel is made with the help of sulphuric acid—pickling, as they call it, the process that removes scale preparatory to plating. In 1951, the sheet division of our great iron and steel industry is estimated to have consumed 140,000 long tons of Sulphur in the form of sulphuric acid. That in itself makes quite a dent in our supplies of Sulphur. Add to this almost as much more for treating wire rod, plate, strip, bars, etc., and you can see that to make finished steel, regardless of form, the iron and steel industry must use lots of Sulphur in the form of sulphuric acid.

Right here is an excellent example of the interdependence of all of our industries. To produce steel requires a lot of Sulphur. To produce Sulphur and other mined products requires a lot of steel. This interdependence of industries is one of the country's sources of strength.

Texas Gulf Sulphur Co.

75 East 45th Street, New York 17, N. Y.



Mines: Newgulf and Moss Bluff, Texas



JUST AROUND THE CORNER



By Vernon Mount

EUROPE SIGHED WITH RELIEF when the conventions added up to one sure thing -- America retains its international viewpoint, no matter who gets elected in November. Informed Europe, that is--for the average citizen is completely baffled by our politics, and our goings on. But our position today is stronger than it ever has been to influence and guide and lead the Western powers to strong collective resistance and to ultimate self-defense.

THEIRS IS THE FRONTIER, and they know it. And our own people know it. Our own politicians know it. Allowing for the natural angles tossed in for campaign purposes, Republicans and Democrats will pull in double harness on the building of a strong moral as well as physical dike to contain the Russian floods.

MIDDLE-ROAD vs RADICAL is the issue of the campaign now, with the battle fought on purely domestic, ideological and economic issues. The next three months should clear out national cobwebs, just as the fish-bowl publicity of the conventions cleared them out of the two parties. The people are getting back into the saddle--informed, interested, eager to vote positively for the first time in many a long year.

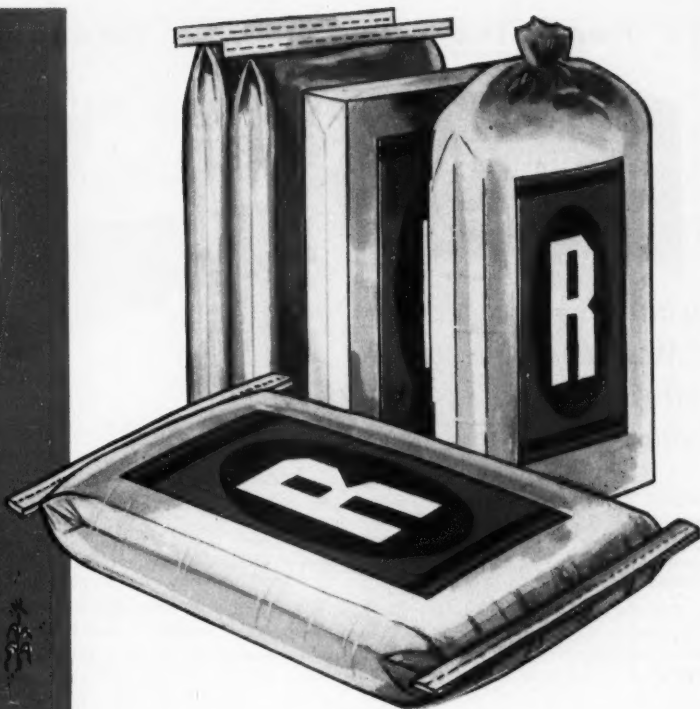
Yours faithfully,

Vernon Mount



**Too little,
too late!**

A good quality commercial fertilizer makes a lot of difference in a crop.



Raymond Multi-Wall paper Shipping Sacks add the finishing touch to a good product.

Your fertilizers, when packed in these better quality, attractively printed Paper Shipping Sacks, will appeal to the buyer of quality products.

Raymond Multi-Wall Paper Shipping Sacks are CUSTOM BUILT in various types, sizes, and strengths. Available printed or plain.

They're Sift-Proof! Dust-Proof! Water-Resistant!

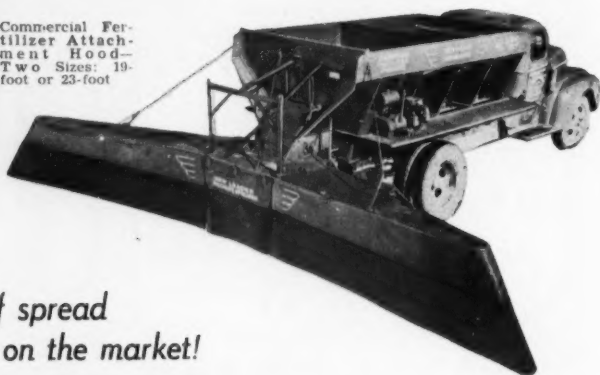
THE RAYMOND BAG COMPANY
Middletown, Ohio

RAYMOND MULTI-WALL
PAPER SHIPPING SACKS

Here's the answer to your Spreading Problems!

AGAIN!
"The NEW LEADER"
leads the field

Commercial Fertilizer Attachment Hood—
Two Sizes: 19-foot or 23-foot



with its new
"Motor-Driven Spreader"
offering greater accuracy of spread
with the most positive feed on the market!

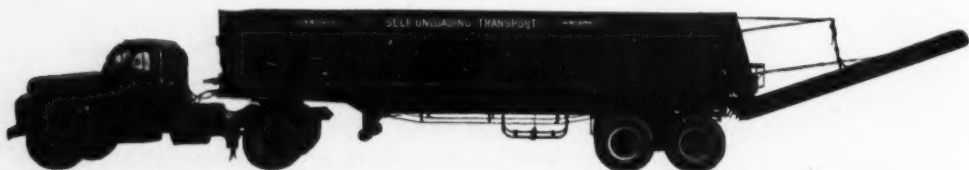
SPECIAL ADVANTAGES—Uniformity of spread is not dependent on truck speed. Motor is mounted on catwalk and drives only the twin distributor discs at a constant speed, assuring full width of spread at all times together with uniform distribution.

Conveyor is separately driven from truck drive shaft by a series of V-belts to deliver the correct amount per acre—regardless of truck speed or regardless of whether the truck is driven in low, super-low or any other gear.

Conveyor speed is, therefore, positively synchronized with speed of the rear wheels of truck and at each revolution of the rear wheels, the conveyor moves a given distance regardless of the truck's speed. Amount of material delivered by conveyor does not vary with hilly or soft field conditions.

Spreader Body Lengths (inside measure) are 9', 11', 13' and 15'. Other body lengths on special order.

Note: When Spreading Attachment is folded up for road-traveling position, width is approximately 7'-5"



"The NEW LEADER" Self-Unloading Bulk Transport

The 20-ton capacity transport above is shown with elevator in place and ready to load a NEW LEADER Spreader truck. These units are proving very profitable; in bad weather they eliminate demurrage on railroad cars; fertilizer gets to the job quickly and spreader trucks can be kept working in the field. The transport, being a self-unloading unit, leaves the tractor truck free to return to pick up another transport load. These units have four individual

compartments of 5 tons each. Each compartment may be unloaded independently of the others. Compartments and rear endgate are removable so that bagged and packaged goods may be hauled instead of bulk loads. Capacity 5 tons to 25 tons, lengths from 11 ft. to 40 ft. Written warranty with all NEW LEADER equipment. Write today for specifications, prices, etc. Fast delivery service sells fertilizer!

FREE! Write for "The Story of a Custom Fertilizer Spreading Service".

HIGHWAY EQUIPMENT COMPANY, INC. CEDAR RAPIDS, IOWA
MANUFACTURERS OF THE WORLD'S MOST COMPLETE LINE OF SPREADERS

Since 1937 high nitrogen has meant higher dairy income

—for Karl Schumann, Mazomanie, Wis.

● In 1937, Karl Schumann of Mazomanie, Wis. received a convincing demonstration of the effectiveness of Ammonium Sulphate on his own pasture. That year, he divided a four-acre field into two paddocks, and treated one of them with Ammonium Sulphate at a rate of 200 pounds per acre.

He rotated five of his Holsteins in the two areas, noticing that the grass in the fertilized area was greener, more lush and liked better by the cows. At the end of 45 days, he terminated the experiment and found the fertilized area not only produced 18 more pasture days but 2,953 additional pounds of milk.

Every year since, Mr. Schumann has used Ammonium Sulphate on his croplands with good results. Every third year he uses a 10-10-10 mixed fertilizer, and the intervening years treats his pastures with Ammonium Sulphate as a straight-nitrogen material.



Bigger yields for farmers mean better business for you

● Both as a straight-nitrogen material or in high-nitrogen mixed fertilizers, U-S-S Ammonium Sulphate has helped farmers throughout the country step up their yields. As more and more farmers learn of its advantages, you'll find a steadily increasing demand.

Be ready for this business by using U-S-S Ammonium Sulphate in your mixed fertilizers. It provides nitrogen that won't leach out of soils during winter and spring rains, yet converts to readily available form in the growing

season. U-S-S Ammonium Sulphate stands up well in storage and doesn't corrode drills or other distributing equipment.

And round out your fertilizer line with U-S-S Ammonium Sulphate in 100-pound bags for direct application.

The fall fertilizer season is just around the corner, so get in touch with our nearest Coal Chemical sales office or write directly to United States Steel Company, 525 William Penn Place, Pittsburgh 30, Pa.

U-S-S AMMONIUM SULPHATE



2-1291

UNITED STATES STEEL

FULTON COTTON BAGS



build lasting
GOOD WILL
for your
product

It's good business and good public relations to give customers something extra for their dollar. You do just that when you use Fulton Cotton Bags, for in every ton of fertilizer (20 bags) there is over 23 yards of quality cotton cloth, which is sought after and in demand for home sewing. Customers not only prefer fertilizer in cotton bags, but also appreciate the extra dividend of valuable sewing material.

Fulton Cotton Bags are easier to handle, too — less subject to tears and snags which incur waste and subsequent profit losses. Step up your own sales with Fulton Quality Cotton Bags — and reap the benefits of consumer preference.

Your nearest Fulton Branch will be happy to work with you in winning new friends and building lasting good will for your product.

Fulton

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LOS ANGELES • NEW YORK CITY, 347 MADISON AVE.



A WHOLE FARM THRIVES ON NOURISHMENT

Pigs or potatoes...cattle or carrots...growth is a never ending process.

And be it animal or vegetable, every living thing on a farm derives its basic nutrition from the soil. These plant-food elements yielded by the soil must also be replenished if the soil is to satisfy the vigorous demands made upon it.

That's where soil-replenishing fertilizers come in. Many of the most effective of these fertilizers contain POTASH . . . often Sunshine State Potash, a product of New Mexico. This fertilizer is more than a mere soil nutrient. It strengthens crops . . . thereby helping them to resist disease and drought.



REG. U. S. PAT. OFF.

HIGRADE MURIATE OF POTASH 62/63% K_2O
GRANULAR MURIATE OF POTASH 48/52% K_2O
MANURE SALTS 20% K_2O MIN.

UNITED STATES POTASH COMPANY, Incorporated, 30 Rockefeller Plaza, New York 20, N. Y.



Second unit of Monsanto-designed sulfuric acid plant built for Armour & Company at Bartow, Florida.

Sulfuric acid for the free world

Approximately 40 per cent of the free world's contact sulfuric acid is produced with Monsanto Vanadium Catalyst and in Monsanto-designed plants. More than 300 of these economical and efficient sulfuric acid plants are in service. They are located in 26 countries throughout the world.

Monsanto-designed sulfuric acid plants, using Monsanto Vanadium Catalyst, do not depend on elemental sulfur alone. They operate with all known raw materials. Monsanto designs, which have many exclusive features, are based on nearly a third of a century of experience in design, construction and operation of sulfuric acid plants.

If you are considering a future sulfuric acid plant, you are invited to consult Monsanto engineers without cost or obligation to you. MONSANTO CHEMICAL COMPANY, Engineering Sales Department, 1700 South Second Street, St. Louis 4, Missouri.



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THE LAMINATED BAG

Stronger than burlap alone, tougher than paper alone. This double-thickness bag with asphalt (or other adhesive) lamination between the burlap (or cotton) on the outside and the paper on the inside is the **perfect answer** to your packaging problems when contamination, weather conditions, grease, acids or water may disturb the clean, dry, freshness of your product.

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345 The Merchandise Mart
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*Long Time Specialists In
Magnesia For Agriculture*

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Calcined Brucite (fertilizer grade) 70/74% MgO
Calcined Magnesite 90/95% MgO

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for Agricultural Use

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DEPENDABLE FOR MORE THAN 60 YEARS

All Steel Self-Contained
Fertilizer Mixing and Bagging Units

Batch Mixers —
Dry Batching

Pan Mixers —
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Tailings Pulverizers —
Swing Hammer and Cage Type

Vibrating
Screens

Dust Weigh
Hoppers

Acid Weigh
Scales

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Subsidiary of United Engineering and Foundry Company

General Office & Works: AURORA, INDIANA



There's
more
than
meets
the
eye
in



HAMMOND Multi-Wall BAGS

Insert shows intricate machinery for tube and gusset formation. Lower photo shows "tubes" coming off large tuber, from which they are conveyed to sewing machines, where they are made into Sewn Type Multi-Walls.



HIGHEST QUALITY PAPERS AND MATERIALS

MODERN MACHINES—SKILLED PERSONNEL

EFFICIENT PLANT OPERATIONS



PASTED
VALVE TYPE



SEWN
VALVE TYPE



OPEN MOUTH
PASTED BOTTOM



OPEN MOUTH
SEWN BOTTOM

Satisfied customers in the industries we serve know that all multi-wall bags are not alike. The combined efforts of progressive management, conscientious and thoroughly trained personnel, and expert sales engineers who thoroughly understand the problems of shipping hundreds of products—are the primary reasons for the superiority of Hammond Multi-Wall Bags. Constant research, improvements in papers and bag construction for specific requirements provide Better Bags for shipping cement, flour, fertilizers, chemicals, potatoes, food, feed, plaster, lime, insulating materials, and hundreds of other products. Write for booklet—"To Serve You Better with Hammond Multi-Wall Bags."

HAMMOND BAG & PAPER COMPANY

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Charlotte, N. C.	Ligonier, Pa.	Houston, Texas	Kansas City, Mo.	Baltimore, Md.

WASHINGTON

OPS figures they'll get more sulphur by offering a bonus ceiling level on added sulphur from small deposits where the Frasch method cannot be employed and when such added production is to be sold for export.

Congress bill for two millions to stage a five-year research program on how to convert salt water into fresh shows that the Government has finally gotten around to taking seriously the water resources problem which informed men have been pointing out for some time back.

New muriate of potash producers can determine ceiling prices on the basis of competitor's current ceiling levels, according to GCPR, SR 59 Amendment 1.

DPA has published a book on industrial conservation—"A guide to conservation engineering practices." As a lot of them turn out also to be excellent economies, you might like to read this, and get the rest of the program offered by DPA, Washington 25, D. C.

The President's Materials Policy Commission, a group of private citizens, has studied the subject, published a four-volume report, and among other things it points up the need for fertilization to take the place of the extra acres we do not have.

The USDA issued the results of a study which reports that if there is need the farmers can step up production about 20%—half in livestock, the other half out of the ground. Assuming, of course, favorable conditions and proper farm practices. USDA will sell you a copy for 25¢. Ask for "Agriculture's Capacity to Produce" and write the USDA Office of Information, Washington 25, D. C.

USDA has submitted to the Con-

It Seems to Me

by BRUCE MORAN



You may remember in June this column warned against the situation in Nebraska, where a fertilizer dealer was being accused of overcharging in 231 sales because OPS contended farmers should be charged the wholesale, not the retail rate.

I expressed the opinion, without legal knowledge, that a farmer is not a merchant—and if this thing stuck we'd have farm machinery and other items classified the same way, with the farmer being classed as a wholesaler or a manufacturer.

At any rate protests have been effective. In "GCPR, Amendment 32—Sales of Fertilizer" OPS has announced that "sales of fertilizers to farmers shall be considered retail sales, instead of wholesale sales under the General Ceiling Price Regulation."

We hope we have been of real service to the industry in our quick pointing out of the danger involved. We know we helped the cause of fair play. If, as newspapers have said, this raises the price to farmers, it is only because they have been unfairly low where the regulation was strictly observed without the protest that should have been made.

INDUSTRY CALENDAR

Date	Organization	Hotel	City	State
Aug 17-23	Grasslands	Penn State	State College	Pa.
Aug 25-29	Atomic	Center Theater	Oak Ridge	Tenn.
Aug 26-28	Phosphorus	U of Ill.	Urbana	Ill.
Sept. 3-5	NAC	Essex & Sussex	Spring Lake	N. J.
Oct 22-23	Safety Section	Conrad Hilton	Chicago	Ill.
Nov. 6-7	Pacific N.W.	Gearhart	Gearhart	Ore.
Nov 10-12	CFA	Desert Inn	Palm Springs	Cal.
No. 17	Application	Netherland Plaza	Cincinnati	Ohio
Nov. 19-21	NFA	Roney Plaza	Miami Beach	Fla.
1953				
Jan. 20	Ga. PFES	U of Ga.	Athens	Ga.
Jan. 21	Ga. Sect., ASA	U of Ga.	Athens	Ga.

gress and to other interested agencies for review, a report which may lead to conservation of the assets of

the five Missouri River Basin watersheds. A 10-20 year program is recommended for each.

A MODERN SUPERPHOSPHATE PLANT

RICHMOND GUANO

By JOHN C. MOOAR, Southern Engineer, Sturtevant Mill Co.

Richmond Guano Company, Richmond, Virginia, has re-entered the superphosphate manufacturing field with a thoroughly modern and highly efficient plant in which, for instance, three men unload, store and reclaim the raw materials, and manufacture and store 160 tons of superphosphate per day of nine hours.

BUILDINGS

These were designed and furnished by the Luria Engineering Corporation, Bethlehem, Pa. They are steel, rigid frame type, clear span, roofed and sided with 4.2 corrugated asbestos, and are:

1. The superphosphate manufacturing building which houses the Sturtevant mechanical den and excavator and its auxiliaries, and the diluting tanks, etc. This building is 50'0" x 60'0".

2. The superphosphate storage building. This building is 80'0" wide x 140'0" long, on 20'0" column centers, and with a 10'0" wide monitor down the center line of the roof to accommodate the Barber-Greene belts which convey the freshly made superphosphate to storage. Along one side of this building is a leanto, 20'0" wide by 140'0" long to form a

runway or working aisle for mechanical equipment recovering the cured superphosphate from storage and depositing it onto a conveyor belt several hundred feet long which takes it over the roof of the dry mixing plant to the manipulating unit in which it is mixed with many other materials to form the dry mix, or "Grades" or "Brands," whichever terminology is preferred.

The roofing and siding is drilled for Nelson studs, one end of which is welded to the building frame, while the other end is threaded and provided with an adjustable nut for tightening the covering to the building.

"SULPHUR SHORTAGE VIRTUALLY ENDED" SAYS FREEPORT'S WILLIAMS

Langbourne M. Williams, Jr. president of Freeport Sulphur Company stated July 17 that the world sulphur shortage, critical since the outbreak of the Korean War, has improved to the point where virtually all sulphur requirements of the US are being met. The outlook for the future, in his opinion, is extremely encouraging as a result of nearly 100 new projects in the US and other free world countries that will substantially increase the supply.

These projects, he estimated, will add some four million long tons third of the estimated 1951 free world production of sulphur in all of sulphur annually by the end of 1955, which is equivalent to one forms.

Even if the requirements of US industry and agriculture should increase by 1955 to the level estimated by DPA, there will be enough sulphur to meet the demand, assuming the new projects measure up to expectations.

EQUIPMENT AND FLOW SHEET OF OPERATION

Sulphuric Acid Storage:

Strong acid ranging from 60° Be. to 66° Be. is received in railroad tank cars, and by compressed air is pumped through a Chicksan Joint Assembly in to a pipe line leading to a plate steel storage tank of 300,000 gallons, designed, built and erected by the Richmond Engineering Company, Richmond, Va. The bottom plate of this tank is $\frac{3}{8}$ " thick and the top plate $\frac{1}{2}$ " thick.

Strong acid from this tank is then pumped to two diluting tanks in the superphosphate manufacturing building, where it is mixed with water to bring its strength down to used strength, which is usually about 55° Be. calculated to 60°F. These tanks are provided with "boots" where the water and acid come together, and coils through which cold water is circulated to keep the heat of dilution within reasonable limits. The boots and coils are of lead, and the tanks are of wood frames, and lined with heavy lead. From here the diluted acid is pumped to the scale on the Sturtevant den.

Dust Storage:

This is provided by a Marietta Concrete silo of light weight aggregate air cell pre-cast staves. This silo is 30'0" ID x 50'0" high, and holds about 1300 tons of phosphate rock dust. Dust is ground at the Florida mines to about 90% through 100 mesh and arrives at the plant in steel, drop bottom cars. From these car hoppers the dust is dropped into a subterranean hopper which feeds a Barber-Greene subterranean belt which conveys it to the boot of a Jeffry bucket elevator which discharges into the top of the silo.

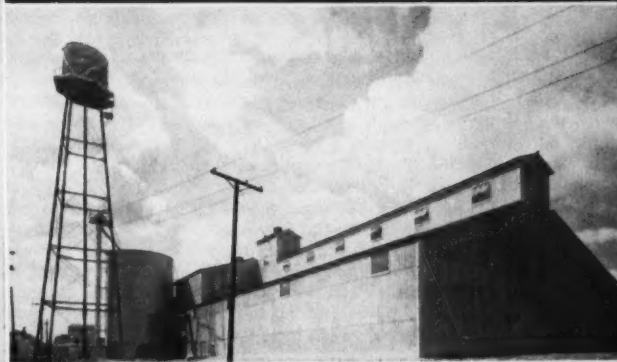
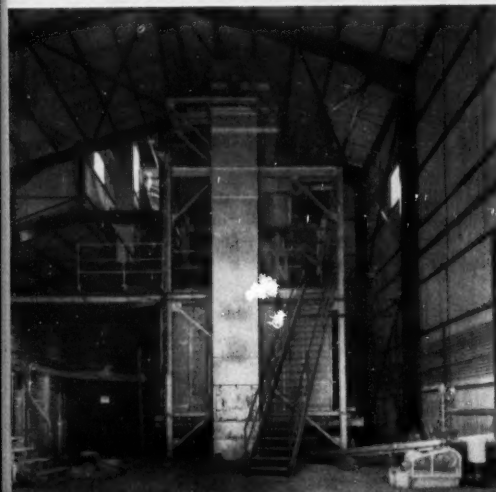
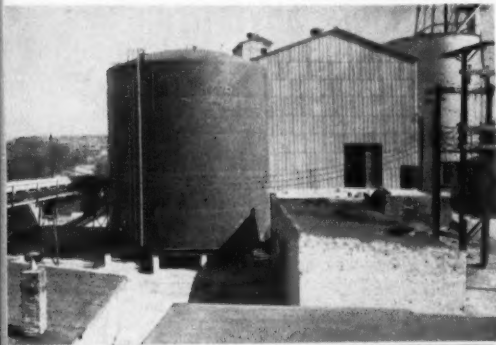
Dust is recovered from the silo through the agency of a Fuller Air Slide specified and furnished by Sturtevant Mill Co. The Fuller Air Slide is simply a steel box approximately 8' x 8', made with or with-

out a steel cover. In the center of the steel box is a fabric screen on which the dust rests when de-energized, and floats when energized through the agency of air introduced under the fabric screen at the rate of approximately 275 cfm at about 3 psi. From loading origin within the silo to discharge point at the Sturtevant elevator lifting the dust to the Sturtevant den, the slides decline approximately 6° from the horizontal. Within the silo are three uncovered slide sections. One of these is the conveying slide, flanked at 30° on each side by a "flanker" or "fluffer." The flankers or fluffers do not extend beyond the limits of the silo. From where the conveying slide leaves the silo it is covered for the full distance to the elevator, and controlled by a solenoid which is

energized and de-energized automatically from the dust hopper on the Sturtevant den, this solenoid cutting the air on and off the covered trunk section, while the air on the three sections within the silo remains on during the entire working day. Air is supplied by a Roctis-Connersville blower driven by a 7-½ HP motor. This highly efficient conveyor, which has long been standard in the cement industry, is now finding its way into the fertilizer industry. Richmond Guano consider it to be the simplest and most highly efficient of all methods of handling phosphate dust. The air slide discharges into the boot of the Sturtevant elevator, and that elevator in turn into the dust garner on the Sturtevant den, and from which automatic control of the slide energy is had.

1. End of den building; large acid tank in forefront; Marietta silo at right; super transfer belt at left. 2. Panorama showing dry mixing plant, left, and new superphosphate plant on right; transfer belt between the two plants. 3. Interior view, showing

Sturtevant den and dust elevator; Fuller Air Slide and Air generating unit. 4. Close-up of new superphosphate plant; Marietta Concrete Silo and Den Scrubber System at far left. 5. Interior of storage building by Luria Engineering.



Superphosphate Manufacture:

This is performed by the batch process in a Sturtevant mechanical den and excavator of which the American Fertilizer Industry is now using 108 of one size and another.

From the garner on the Sturtevant den, dust is drawn into a Sturtevant dust scale provided with a Fairbanks dial and tape recording mechanism, while acid from the diluting tanks heretofore described is pumped to a circulating boot on top of the den from which the excess flows back to the tank while the required amount is drawn into a Sturtevant acid scale provided with Fairbanks dial and recording tape mechanism. The required weights of dust and acid having been drawn, they are dropped into a Pratt two-ton superphosphate mixer provided by Sturtevant Mill Co., and from which the mixture, which is now a thin slurry, is dropped into the box compartment of the Sturtevant den. During this operation a fan is pulling on both the mixer and the den to pull off the steam, CO₂ gas and fluorine, pulling them through a series of vertical water sprayed towers to wash down the pungent fluorine into a solid salt.

The so-called "box compartment" of the Sturtevant den is a steel framed car, the floor and back wall of which is lined with concrete. The ceiling, which is stationary, is also of concrete. The side doors, two in number, are lined with lumber and hung slightly eccentric so that when released at the bottom they swing away from the block of superphosphate to permit the car to travel to the revolving cutters. The front door is also lined with wood, but when the den is ready to discharge, it is lifted out of the way vertically by a motor driven chain hoist. The car, which contains the block of superphosphate, is driven by a three HP motor, vari-drive and reducer mounted on the car frame. The cutters, which are circular, are driven by a 10 HP motor reducer, and so constructed as to constitute a fan blowing air against the face of the block of superphosphate during excavation. As the superphosphate is scraped off the face of the block it

is in finely divided form and as such is discharged by the cutters into the boot of a Sturtevant 26" x 60" steel superphosphate elevator with head take-ups. The superphosphate is discharged from this elevator onto a Barber-Greene conveyor system in the monitor of the building, and from which it is dropped into storage at any pre-determined point in the storage building.

HISTORICAL

The Richmond Guano Co., having decided that re-entry into the manufacture of superphosphate must be predicated on sound engineering and the provision of the most modern buildings and equipment, placed in general charge of the design and construction their Secretary, Mr. L. Dudley George, an experienced civil engineer. He in turn selected as engineering co-ordinator the Rich-

mond firm of Slaughter, Saville and Blackburn and their Mr. W. Andrew Green as Resident Engineer. Mr. George then selected the following machinery and other equipment vendors:

Fuller Co., Catasauqua, Penn.; Duriron Co., Dayton, Ohio; U. S. Pipe & Foundry Co., Bessemer, Ala.; Fairbanks-Morse Co., New York; American Blower Co., Buffalo, N. Y., all through Sturtevant.

2. Marietta Concrete Corp., Marietta, Ohio.

3. Richmond Engineering Works, Richmond, Va.

4. Barber-Greene Co., Chicago, Ill.

5. Southern Lead Burning Co., Atlanta, Ga.

6. Jeffry Mfg. Co., Columbus, Ohio.

NCA and MONSANTO AGREE WITH OUR STAND ON CONDITIONER ADVERTISING

Following our editorial comment last month concerning the danger of exaggeration concerning the soil conditioners, we were interested to note in the mail, after we had gone to press, but before the July issue appeared, two strong comments on the same subject. One from the National Agricultural Chemicals Association bulletin, the other a talk by Howard K. Nason, Monsanto's director of research.

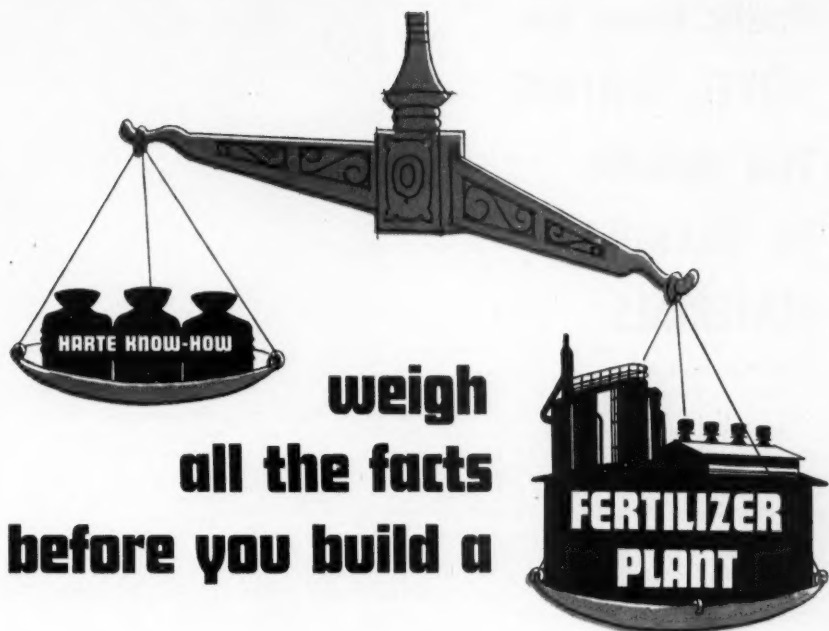
Both made exactly the point we had made—that, to quote Howard Nason, "There is grave danger of public reaction against agricultural chemicals generally, and soil conditioners particularly . . . that the sincere labors of reputable workers may not be jeopardized by the extravagant statements of some sellers."

Speaking for Monsanto, and expressing their obligation, as original developers of synthetic soil conditioners, the talk included this description of what a soil conditioner may be expected to do:

"Synthetic soil conditioners, like

the polyuronides (plant gums) introduced by the normal decomposition of such natural structure-improvers as manures, composts and plant residues, act principally upon the clay component in soils and to a much larger degree upon the finer silt components, to stabilize the particles against the dispersing or slaking action of water. If the soil has been worked by any suitable mechanical means (such as hand tools, rototillers or full-scale farm machinery) into the desirable granular condition characteristic of a good seed bed, then the action of the conditioner on the clay will produce agglomerates whose persistence in the soil will preserve the loose, porous condition which is necessary for good "tilth." This formation of stable agglomerates, or aggregates, with clays and fine silts is the primary action of soil conditioners, natural as well as synthetic. The beneficial effects which are obtained, such as increased aeration, augmented water-holding capacity, im-

(Continued on page 60)



**weigh
all the facts
before you build a**

Extensive research and investigation of all the facts are necessary to make the building of a fertilizer plant economically sound. Where is the plant to be located? What is its proximity to supply? To distribution? How seasonal are demands in the plant area? What basic ingredients will be used more often? What return can be expected on the capital investment? These and many other facts must be considered in order to produce a sound enduring investment.

Many years of experience in the fertilizer industry have made Harte engineers cognizant of the over-all picture of fertilizer plant design,

realizing that certain fundamentals must be followed while specializing the design of each plant. All possible facts are studied and adapted to fit each individual fertilizer plant.

The invaluable experience of Harte engineers is available to aid you in your fertilizer plant design. If you plan to build a fertilizer mixing plant, or an associated plant, the Harte organization of specialists can handle your complete job or any part from original design to an operating plant . . . assuring economy and speed.

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Pacific Guano has NOVEL CONTROL FOR MIXING OF GRANULAR MATERIALS

By GEORGE P. GRAY

Keeping step with rapidly increasing use of commercial fertilizers and pesticides in California, the Pacific Guano Company, Berkeley, has found it necessary to modernize and expand its plants at Berkeley and Los Angeles. Automatic or semi-automatic batching systems recently have been installed in both plants. Most of the improvements already are known to the industry but special mention should be made of a novel contrivance in use at Berkeley. It is a device that permits weighing into a mix of 2,000 pounds of materials with accuracy of 1 pound per 1,000. While the first use of this invention was in a fertilizer mixing plant, other uses suggest themselves, wherever granular materials are to be mixed with accuracy. A description of this semi-automatic batching control is given in later paragraphs.

Expansions

The Company's most recent acquisition is a toxophene processing plant to round out the insecticidal dust mixing plant installed several years ago.

A sulphur grinding plant has been in operation since middle 1951. Texas brimstone is run through a 5-roll Raymond mill for production of a 325-mesh output. Fire prevention has been given especial attention by providing for replacement of air in the processing machinery with

carbon dioxide to such an extent that the remaining oxygen is insufficient to support combustion. As an additional safeguard, a Hayes analyzer indicates the amount of oxygen in the system. This provides automatic control so that all machinery is shut down instantly should a dangerous amount of oxygen be indicated. Automatic fire control sprinkling systems are installed in the plant and in the 24,000 square foot warehouse.

Semi-Automatic Batching Control

Credit is given by Weller Noble, President and by R. J. Crum, Division Manager, to the inventive genius of Berkeley Plant Superintendent, P. D. Collins, for perfecting a smooth-running semi-automatic batching control. This device has been in operation at the Berkeley plant without trouble of any sort since October, 1951.

A standard Sturtevant 6-hopper batcher of 60 tons capacity was set up without the control mechanism. Instead, the Collins invention was put to use as a control. Now after modernization and with the help of the new control, a reduced number in the mixing crew produces a substantial increase in tonnage per hour. With increased capacity of the mixer and with additional bagging units, a still further increase in production could be made at the same labor cost.

Production capacity is not the only



Fig. 1—Plus-Pressure Control Room on Ground Floor.

advantage. Precision delivery of components of a mix, accurate to one pound per thousand, has largely eliminated the bugaboo of deficiency reports from the Bureau of Chemistry, State Department of Agriculture which is in control of the State's fertilizer regulatory law, which requires accurate weighing of ingredients and thorough mixing.

Preliminary Studies

Previous to completion of Pacific Guano's modernization program at Berkeley, Superintendent Collins made a study of procedures in assembling and mixing granular materials by visiting various plants in the nation. A common fault was noted, time lag in the cutoff of weighings of charges to the batch, sometimes causing an error of 50 pounds per ton. The pneumatic or water-hydraulic gate control systems used seemed inadequate because of this time lag caused by the low operating pressures in use. Electronic controls, while very accurate, were barred from use because they are complicated, are adversely affected by dust, and are expensive.

Upon his return, Collins set to work in an effort to devise a feeder control of greater accuracy and speed than any that might be reasonably adopted. Aid of the Rucker Com-

pany, Oakland, California, was enlisted to handle detailing and construction work in connection with development of the device that Collins had visualized.

Description of the System

Description of the system now in use at the Berkeley plant may be done best by starting at the top. All materials are bulk handled. Components of a mix are elevated to overhead bins by a bucket conveyor and distributed, as required, by a rotating discharge chute to any of the 6 bins of 10-ton capacity. The bin being filled is indicated to the operator on the ground floor by light signals. Pressure-electric devices here show when a bin is full or empty.

Ingredients of a mix are discharged from the upper bins through 15 by 15-inch openings into a sloped-bottom receiver mounted on scales. Weight of each charge is indicated on the dial of the scale in the control room on the ground floor. Successive additions show cumulatively on this dial. (See Figure 1)

Desirable Dribble

Controlled dribbling is an important feature of the invention. Two superimposed swinging, single-leaf gates close the bottom of each delivery chute. Operation of these gates is synchronized by a linked high pressure oil-hydraulic system. The operator in the control room first opens both of the gates under a bin simultaneously by moving a lever in the lower row as shown in Figure 1. This permits very fast delivery into the weigh hopper through the 15 by 15-inch chute. Size of opening and speed of delivery can be judged and controlled by watching the hand on the scale dial in the control room. When the hand indicates that nearly enough material has been delivered, the upper gate is closed and the remainder of the charge is dribbled in by jiggling the corresponding lever in the top row. It is so arranged that, when both gates are open, it is done slowly for the first rapid full-flow delivery but the gates are closed at very high speed.

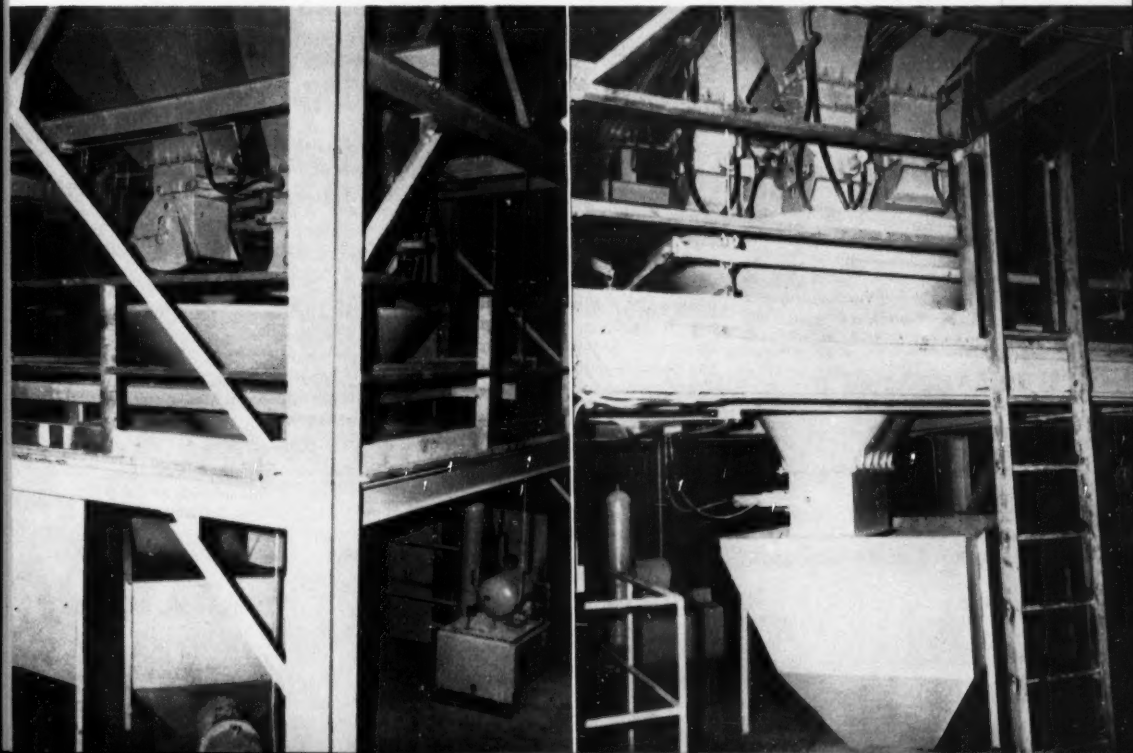
The dribbling gate, an important feature of the system, is operated at high speed for both opening and closing. Quick and positive stoppage of flow is thus provided for. The novel features of the dribbling device, for completion of weighings, deserve special mention. The final few pounds of a charge are let out through a triangular opening in the upper gate, size of which can be changed to accommodate different materials.

Small amounts of materials are discharged by swinging back the lower gate to uncover the point of the triangle first. Rate of delivery increases as the lower gate is moved toward the base of the triangle. A mere trickle or a faster flow can be regulated by the operator's jiggling the upper row of levers in the control room and thereby fluttering the lower or dribble gate. High pressure oil-hydraulic control assures positive and fast cutoff of flow. The sides of the triangular opening are built up about one-half inch so that only the edges impinge upon the surface of

(Continued on page 31)

Fig. 2—Oil-Hydraulic System Constructed by the Rucker Company.

Fig. 3—Over-all View of Pacific Guano Company's Batch Plant Installation. Note double cylinder operation of upper hopper gates to control full flow and dribble feed.



ARIZONA

Arizona Fertilizers, Inc., Phoenix, have opened a new plant at Toltec which will process 7 tons of insecticide per hour, in 1000 pound batches. It was designed by their engineer, **Frank Marek**. Further equipment is to be installed which will process technical insecticide materials.

ARKANSAS

Lion Oil, El Dorado, according to President **T. M. Martin**, has formed a new operating division to be known as the Production and Exploration Division. It will be divided into four regions, each headed by a manager: Denver, Colorado, **C. L. McArthur**; Midland, Texas, **F. H. McGuigan**; Wichita, Kansas, **R. I. Williams**; Shreveport, Louisiana, **Bert E. Gamble**. The entire operation will be headed up by Vice-president **John E. Howell**, with **Frank Richardson** as assistant general manager.

CALIFORNIA

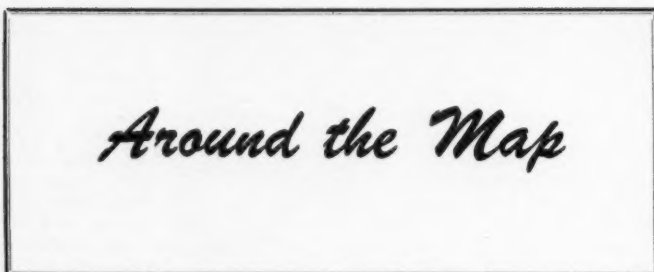
American Potash and Chemical, Trona, is building a \$300,000 laboratory in the Los Angeles area, as part of the program of research on boron and lithium compounds from its own raw material. The new unit does not replace, but will supplement, the laboratories and pilot-plant operations at Trona.

DELAWARE

Hercules Powder is building an experiment station near Wilmington to expand work in agricultural and other fields. The cost is around \$400,000, and the laboratory—begun in September—is expected to be ready by April. Chief entomologist **Dr. E. N. Woodbury** heads the work with a staff of fifteen.

FLORIDA

Davison Chemical has announced the construction of a triple superphosphate plant at Ridgewood, near Lakeland, which is scheduled to be completed October 1 next year. It will be Davison's first entry into the triple field. The project is part of a \$25,400,000 production expansion



The new general research laboratory at Skokie, Illinois, recently opened for formal inspection by International Minerals & Chemical Corp. It centralizes a large part of the IM&C research, and accommodates a staff of 75 under the direction of Dr. Paul D. V. Manning, vice-president in charge of research and development.

program, and is another step in the progress of the industry toward high analysis fertilizers. The Door process will be used and the **Door Co.**, Stamford, Connecticut are architect-engineers, while **Consolidated Engineering** of Baltimore are general contractors. The plant will produce its own sulphuric acid. **Dr. Allan T. Cole** will be in charge, as he is of the other Phosphate Rock Division activities.

• • •

Chatelier's Plant Food, St. Petersburg, reports production of 10,000,000 pounds annually of its nursery and household fertilizer, whose claim to fame is based on containing "all known secondary elements in a complete plant food" and was developed by **Dr. Paul T. Chatelier**, biochemist, whose nutritional research studies led him to launch the project in 1937. Recent financing has permitted the present expansion of the business which has multiplied more than 50 times in the last year.

GEORGIA

Southern Fertilizer & Chemical, Savannah, is marketing a granulated fertilizer, in 5-10-5 only this year. **Allen D. Brent**, production manager says several hundred tons have been

produced for the market tests. Southern's new contact sulphuric plant on Hutchinson Island is now in full operation, producing daily 90 tons of 100% sulphuric on equipment designed by **Nicolay Titlestad**.

IDAHO

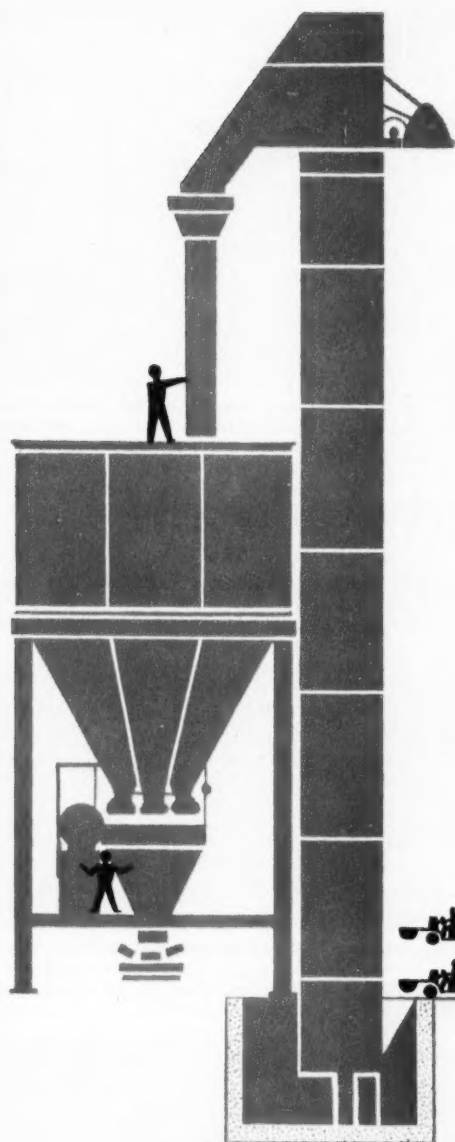
Pacific Supply Cooperative, Walla Walla, Washington and **Central Farmers Fertilizer**, Chicago, will build \$30,000,000 worth of fertilizer plant in southern Idaho subject to the construction of the Hell's Canyon dam and sale of electric power between 2.5 and 3 mills per kwh. The plant will produce phosphoric acid sufficient for 175,000 tons of triple superphosphate annually.

KANSAS

Nito-Fertilizing Co., Inc., Salina, is capitalized at \$40,000 to make and sell fertilizers and deal in farm equipment. **G. M. McClennan** is resident agent.

• • •

National Fertilizer Co., Inc., Kansas City, is capitalized at \$50,000, to make and sell fertilizers. **Maurice E. Gjovig**, Dodge City, is resident agent.



14

MORE Fertilizer Plants Have Chosen D-K Cluster Hoppers *because*

(1) D-K HOPPERS

Save Labor

Normal operation requires only 4 men—two men operating pay-loaders, one man operating swivel chute and one man weighing.

(2) D-K HOPPERS

Speed up Operation. Twice the material handled in half the time

(3) D-K HOPPERS

Increase capacity by 50%

(4) D-K HOPPERS

Cost Less

Also Manufacture Complete Line of Fertilizer Equipment

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ATLANTA, Ga.

Station D

Blue Valley Fertilizer Company. Marthasville, are building a fertilizer plant with an annual 15,000 ton capacity of granular, low-moisture, high-analysis product. This is the plant we mentioned last last month, inadvertently under Missouri. Messrs **Koelling** and **Thompson**, mentioned as builders, are partners. **W. P. Glaspey** is production manager.

KENTUCKY

Cooperative Fertilizer Service has bought a tract at Louisville as a site for their new dry-mix plant. As mentioned last month, protests by neighbors blocked progress, but this has now been cleared up.

LOUISIANA

Lion Oil, El Dorado, Arkansas, has let contracts for the construction of the Barton chemical plant at Luling, whose financing was reported in our June issue as requiring \$31,000,000 and which we reported at the time will produce 300 daily tons of anhydrous ammonia, part of which will become prilled ammonium nitrate. Construction is scheduled to be completed and the new facility in operation early in 1954. **Chemical Construction** will be architect-designers; **The Lummus Company** will be prime construction contractors.

Commercial Solvents president, **J. Albert Woods**, has announced construction of a plant, near Sterlington, which will employ a new and unique process for the production

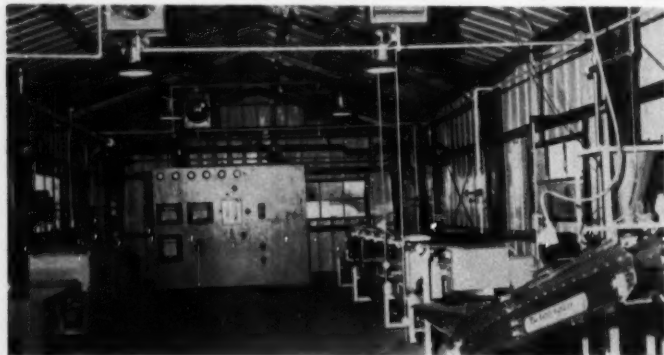
of solid ammonium nitrate fertilizer. At Sterlington, the basic materials, anhydrous ammonia and nitric acid, are already being made by the company. An area of twenty-two hundred acres has been purchased about 2½ miles from the present ammonia production unit. The new ammonium nitrate plant will be located in the center of this property.

Production of ammonium nitrate fertilizer by **Commercial Solvents** will be in addition to anhydrous ammonia and nitrogen solutions which are already being marketed by the **Agricultural Chemicals Division** of the company.

Selection of the new process was made after several years of experimental work. The process was developed by **Leonard A. Stengel** of **Commercial Solvents' Research and Development Department, Terre Haute, Indiana**. The process is patented and all rights have been assigned to the company. Mr. Stengel is an authority and holder of many patents pertaining to high pressure synthesis of ammonia and methanol produced from natural gas. In 1926, he placed in operation the first synthetic methanol plant in the United States which was built by **Commercial Solvents** at Peoria, Illinois.

A pilot plant (see picture) has been in operation at Sterlington for the past year and has been the basis for designing a commercial unit. The Engineering Department of the company is handling the design and engineering requirements for the plant.

Pilot plant for the production of ammonia nitrate by the Stengel process, in the Commercial Solvents plant at Sterlington, Louisiana.



Advantages of the Stengel process over conventional processes now being used are as follows: (1) lower capital investment; (2) reduced operating expenses; (3) shorter time required to build the plant due to simplification of construction and process; (4) with the Stengel process particle size can be changed and "custom-sized" to meet the customers' needs.

Field tests which have been conducted indicate that the product flows well in drills and spreading units.

Mr. Woods said "design and engineering work on the plant are going forward and completion of the plant is expected by July 1, 1953. The material will be marketed through fertilizer manufacturers, and should help relieve the shortage of solid nitrogen fertilizers which still remain in short supply."

MICHIGAN

Monsanto's phosphate division expects to complete its new dicalcium phosphate plant at Trenton by the first of next month.

MISSISSIPPI

Mississippi Chemical, Yazoo City, is proceeding with the expansion plan reported here in May. The stockholders voted to sell another \$4,000,000 in stock for half the required amount, the rest to be borrowed. When the expansion is completed the plant will produce another 120 daily tons of anhydrous ammonia and 150 daily tons of ammonium nitrate, which will virtually double present capacity. **Owen Cooper** is executive vice-president. **Mid-South Supply Co.'s** manager, **Hobson Vandiver** says his organization has agreed to warehouse and distribute the ammonium nitrate produced.

MISSOURI

Monsanto have announced another formula, a variety of Krilium soil conditioner for use in greenhouses and nurseries and known as the Loemaker formula, according to **Roy L. Brandenburg**, General Manager of their merchandising di-



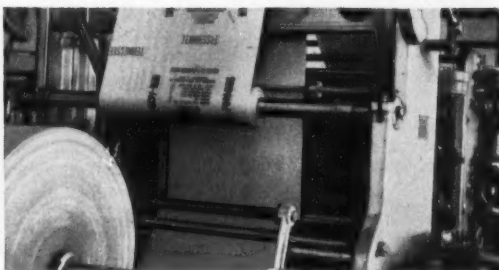
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vision. It will be made available in 10, 25 and 50 pound units as contrasted with the one and five-pound units of the Merloam formulation for home gardening. Prices on the new formula range from \$34.50 for 10 pounds to \$166.25 for 50 pounds.

Pike County Fertilizer Company. Louisiana, is a partnership formed by H. R. "Bobby" Burns, Jr., and O. P. "Pat" Benning to warehouse and apply fertilizer.

Missouri Farmers Association is establishing an anhydrous ammonia storage installation at Jasper, distribution to be handled by the MFA Farmers Exchange there.

Thurston Chemical Company have set August 9 for the opening of their new plant at Trenton. A tour, speakers, entertainment, free refreshments are on the program. FFA chapters have entered an attendance contest and will be awarded prizes during the opening day.

OHIO

Nitrogen Division has awarded a contract to Dravo, Pittsburgh, for the construction of a new oil unloading dock at South Point.

International Minerals & Chemical is having trouble with the authorities of Spencer Township over "ma-

lodorious refuse" dumped on its land. Residents for several miles around contend the odors sometimes drift to them.

OKLAHOMA

Deere & Co. will build a \$20,000,000 ammonia and urea plant at Pryor, and enter the sale of fertilizer chemicals. Early 1954 is the date at which the plant is scheduled to go into production. **Foster-Wheeler** designed the plant. **L. A. Roland**, Deere vice-president, is scheduled to head the operation.

TENNESSEE

Chemi-Dent Products, Inc., Kingsport, is a new manufacturer of soil-conditioners and insecticides. **Thomas W. Owens** is president; **Hugh S. Reams** is vice-president; **James S. Lyle** is secretary-treasurer.

Tennessee Copper Company, Copperhill, has been authorized by DPA to expand production of sulphuric acid with construction and equipment costing \$2,944,500.

TEXAS

Campbell Fertilizer Company, Houston, have completed a \$30,000 expansion program which in effect doubles their capacity to 20,000 annual tons. For 19 years they have produced fertilizers, using Hou-Actinite as a base. **B. L. "Red"**

Henderson is president; **F. Campbell** is vice-president.

UTAH

Stauffer Chemical Company, pioneer Western manufacturer of superphosphate, has announced an agreement with the **American Smelting & Refining Company** and the **Kenecott Copper Corporation** for the erection and operation of a large plant near Salt Lake City to produce approximately 60,000 tons per year of concentrated phosphate fertilizers. In addition, phosphoric acid will be produced there by the wet process. Phosphate rock will come from Stauffer's extensive deposits in Wyoming and Idaho, and sulfuric acid from **Garfield Chemical Company's** plant now being enlarged at Salt Lake City. The additional acid will come from smelter gases, and will not require scarce sulfur. The recovery of uranium and vanadium is contemplated. Construction will commence late this summer, and the plant will go on steam during the summer of 1953.

The joint company, as yet unnamed, will be capitalized for between 4 and 5 million dollars. Approximately 600 acres have been reserved for the operation.

VIRGINIA

Virginia-Carolina has borrowed \$5,000,000 from institutional lenders, bringing to \$10,000,000 their long term borrowings at an average combines rate of 3.79%. The new loan is repayable in 10 equal installments, beginning in 1957. President **J. A. Howell** says the new loan will be used for a construction program and as working capital.

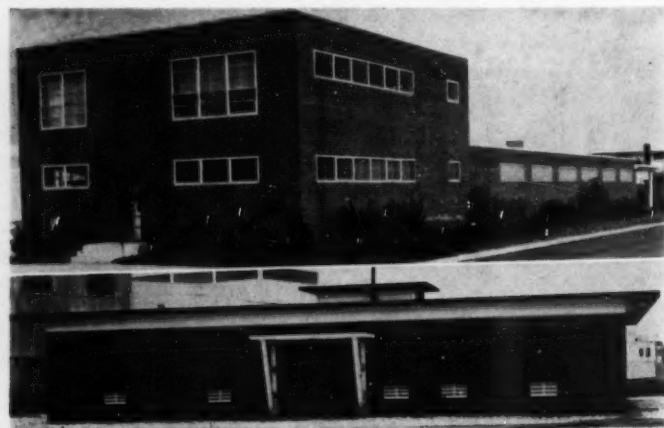
CANADA

Western Potash has begun drilling the first of the four potash wells planned on their holdings in the Vera-Unity area of Saskatchewan.

PORTUGAL

Amoniacos' new ammonium sulfate plant is in production, now turning out 25,000 annual tons. This brings Portugal's total annual tonnage of ammonium sulfate to 80,000.

Agricultural expansion in the Southeast has created the need for these new Wilson & Toomer Fertilizer Company buildings in Jacksonville, according to Wallace B. Hicks, president. Top is the new 3-story addition, which brings 5000 square feet of floor space, and comfortably accommodates between 25 and 30 executives and employees. Below is the new and modern analytical and research laboratory, containing 3000 square feet of space, with filtered air, semi-glazed tile interior walls, accommodating the activities of four graduate chemists and four assistants work on fertilizer and insecticide research and quality control.



PACIFIC GUANO

(Continued from page 25)

the lower gate that is used to open and close the triangle dribbling opening. This construction permits free operation of the two superimposed swinging gates without jamming as would be the case if the two were hung with minimum clearance between the two faces.

Control Room

The operator of the system is comfortably located away from dust in a plus-pressure room on the ground floor. (See Fig. 1) Before him, on a panel, is a row of levers to operate the control gates. Each is marked with interchangeable tags showing the name of the material in the corresponding overhead bin. The lower row of levers is for fast, first delivery of material to the weigh hopper. Directly above each of these is another row of levers to control the dribbling gates to complete the weighings.

With the mix card before him, the operator sets magnetic pointers around the Fairbanks-Morse scale dial in series corresponding to the weight of each successive ingredient to go into a one-ton mix. Each addition shows cumulatively on the dial. Rapid first delivery of most of the charge and final dribble to exact poundage accurate to 1 pound per thousand previously has been described.

Hydraulic Control

Credit for designing and constructing the oil-hydraulic system goes to the Rucker Company. The apparatus shown in Figure II provides a pressure of 1500 psi using Calol Turbine Oil 9. A Dudeco pump driven by a 7½ hp explosion-proof motor delivers 8 gpm at 1200 rpm.

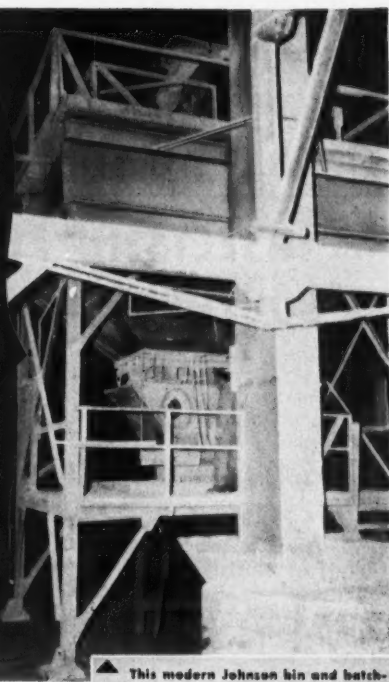
Figure III, upper, shows the bottoms of the delivery chutes from the overhead bins closed at the bottoms with swinging gates. Weigh hopper appears in the center of picture with discharge bin below. From here the weighed materials are carried to the mixer by a screw conveyor under the floor.

Fifteen minutes per day is all the time required to inspect and lubricate the system.

JOHNSON fertilizer PLANT

- elevates
- pulverizes
- screens
- batches AND
- blends

IN ONE CYCLE
OF OPERATION



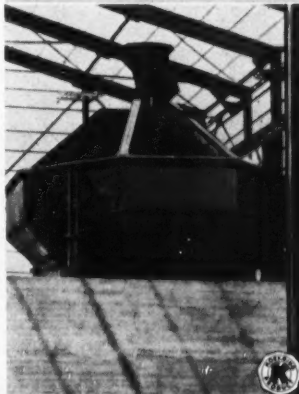
▲ This modern Johnson bin and batching equipment increased production 25% for a large midwestern fertilizer manufacturer . . . and, at the same time, greatly reducing manpower requirements in the plant.

▼ Photo below, of one of Latin America's most modern fertilizer manufacturing plants, shows hopper, pivoted distributor and 8-section bin of a C. S. Johnson blending plant.

By eliminating slow, costly manual operations, Johnson fertilizer blending plants profitably increase production output . . . and earn important savings in manpower. For example, on one typical Johnson installation, material travels via bucket elevator to clod breaker, where it is pulverized, then carried on belt conveyor to separating screen.

Collecting hopper under screen feeds the pulverized material to a pivoted distributor which charges a sectional 5-compartment bin. Multiple-material batcher accurately weighs 5 (or more) fine-grained materials and discharges batch into mixing unit for final blending operation.

Whether you are interested in complete plant installations, manual or fully-automatic, or need auxiliary equipment to modernize your present facilities, it will pay you to see your C. S. Johnson Co. distributor . . . or send coupon today for more complete information.



Mail to: **C. S. JOHNSON CO.** CHAMPAIGN, ILL.
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☐ Send us more data on Johnson fertilizer blending plants. ☐ Have Johnson distributor call.

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Also interested in: ☐ bulk phosphate storage plants ☐ aeration systems ☐ screw conveyors
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In the Field of

ALLIED FARM CHEMICALS

INSECTS IN RELATION TO SOUTHERN AGRICULTURE

By W. L. POPHAM,

Crop pest control is essential to a stable and profitable agriculture. Insects and plant diseases exert terrific pressure on the agricultural production of the country, perhaps more in the South than in any other region. The control of these pests can do much to stabilize our agricultural economy.

Scientific agriculture would seem, logically, to fall in four broad areas of interest. The first concerns the farmer's health. Prosperous agriculture must take into account the health and well-being of the farmer and his family. The second is soil conservation and fertilization, clearly essential to the preservation of our agricultural economy. The third is the development and improvement of crops to meet our steadily increasing and shifting demands. Much of our thinking and planning in the broad field of agriculture has been concerned with either soils or crops. The fourth area, and one which is steadily increasing in importance, pertains to crop protection—protection from the insects and diseases that levy a constant and burdensome tax on practically everything we grow. My remarks today deal primarily with crop protection as one of the few remaining agricultural frontiers of our time.

We find insects and diseases wherever we turn in agriculture. Some, of course, are pollinators, and we must depend on them for such services. But there are too many

others around that destroy the pollinated crops. This destruction we cannot tolerate when increased agricultural production is so essential to the welfare of our country. Virus diseases affect, in one way or another, almost every plant or animal. Most of these viruses are transmitted to some extent by insects, and some are transmitted only by insects. Our livestock is subject to attack by insects and other animal parasites as well as virus diseases. Our crops are attacked by nematodes and other soil-infesting organisms that are little understood today, and urgently in need of more study.

I am afraid that too few of our agricultural leaders are aware of the terrific impact insects and plant diseases exert on our agricultural economy, . . . and the opportunities existing in the field of pest control for stabilizing and improving our agricultural production.

Scientific achievements in agriculture have been great in recent years. Hybrid corn gives us 25 to 30 percent more production annually. Hybridization promises greater yields of other crops. New varieties of cotton and new methods of planting, tillage, and harvesting add materially to our total production. Still, we fall far short of the potential when we permit insects and diseases to take 5, 10, or 15 percent of the volume.

Insects and other plant pests begin their destruction when we plant the seed. They continue through the growing season, through harvesting, and into the storage bins. They may continue their ravages during

the processing, packaging, and marketing of the finished products. Some have estimated that effective control of insect pests could increase the annual production of our most essential crops by 10 percent or more. Increases would be considerably more in some crops.

Reductions in a stand of cotton, corn, wheat, or vegetable crop because of insects are commonplace. Fruits or vegetables may be culled 5, 10, 25, or even 50 percent before they meet grade or marketing standards. Substantial quantities of fruits and vegetables are condemned by canners each year because of the presence or danger of insect fragments.

It costs the farmer just as much to produce an acre of crops. His potential production is so many bushels, bales, or tons per acre. He has his investment in the land. He buys his fertilizer and seed; he cultivates, harvests, and stores. Every seed damaged, every plant stunted, every stalk injured, and every ear that does not fill is a reduction from potential yield. The farmer pays for a full crop but he doesn't get it.

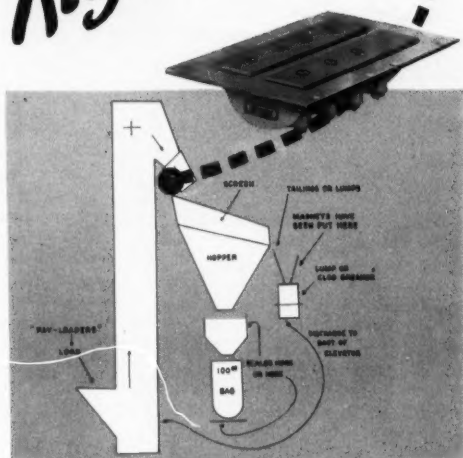
Furthermore, severe crop damage by insects can add appreciably to the cost of harvesting and processing foods and fibers. Take, for example, cotton infested with pink bollworms, wheat infested with wheat-stem sawflies, potatoes infested with wireworms or white-fringed beetles, or sweet corn infested with corn earworms. Present-day markets demand fruits and vegetables of high quality. They must be free of damage from insects and diseases if they are to command profitable prices.

Pest control obviously is a major factor in agriculture today.

There is nothing so important in the economy of a country as the health of its people. Healthy agriculture requires healthy farmers. In spite of deep, fertile soils, and adaptable crop varieties, a prosperous agriculture was for many years impossible in many parts of the world because of insects. Not so long ago this problem was basic to the economy of the South.

Summary of comments made by W. L. Popham, Assistant Chief, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, at the meeting of the Cotton States Branch of the American Association of Economic Entomologists

Right Here



IS WHERE A DINGS PERMA-PLATE MAGNET CAN SAVE YOU MONEY

A non-electric Perma-Plate magnet in the discharge chute of your bagging mill elevator can be a profitable investment.

HOW? By removing the nuts, nails, bolts, etc. often found in fertilizer.

WHY? To protect your machinery as well as your customers. In addition, a U. S. Dept. of Agriculture study shows many fertilizer plant explosions are set-off by sparks caused by tramp iron in grinding machinery. A Perma-Plate could prevent this.

THE ANSWER. Dings Perma-Plate magnets are low cost, non-electric, guaranteed permanent. No magnet of this type is more powerful. No electrical accessories whatever are needed. The magnet is simple to install. It will pay you to investigate today.

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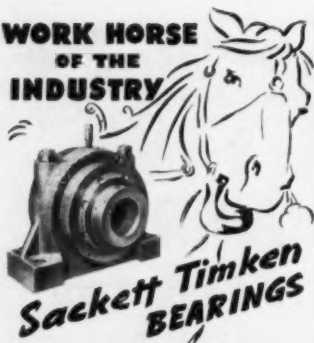
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TIMKEN

**THE A. J. SACKETT & SONS CO.
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BALTIMORE 24, MARYLAND**

Early in this century yellow fever and the notorious "miasma" sent plantation owners in ever-increasing numbers to more northern climates—away from the disease we now know as malaria. Malaria won many battles in the South, just as it has in tropical and subtropical areas in other parts of the world. DDT has virtually brought an end to malaria. We now have only a few hundred cases a year in this country as compared with hundreds of thousands some years ago. It is no longer a major economic factor.

Hardly less spectacular were some of the insect problems concerned with livestock. Texas fever, once considered a serious livestock problem in the South, received the attention of scientists even before insects were found to transmit yellow fever and malaria. We might speculate for a moment as to where the cattle industry of the South would be today if fever-carrying ticks were abundant?

We now have methods for controlling many of the insect parasites of livestock. As they are more fully utilized, southern stock growers will stabilize their industry and further expand their herds. Horn fly control during severe outbreaks, as you know, had added half a pound of beef per animal per day to our national production and has increased milk yields up to 15 percent. This development is less than six years old; yet nearly a third of all the cattle in the country are now treated each year for horn flies. More developments like this one are sure to come.

However, it is in the realm of plant protection that most people think of insects and diseases, and it is here that entomologists, plant pathologists, chemists, plant breeders, and agricultural engineers have accomplished much in recent years.

When the boll weevil swept across the South from Mexico in the early part of this century, it was a severe shock to the agricultural economy of the South, but the discovery of calcium arsenate and the develop-

ment of mechanical ways of applying it softened the blow. We now have new insecticides of superior effectiveness, and we have found new and better ways of using them, with the result that the number of southern farmers making insect control a regular practice is steadily increasing.

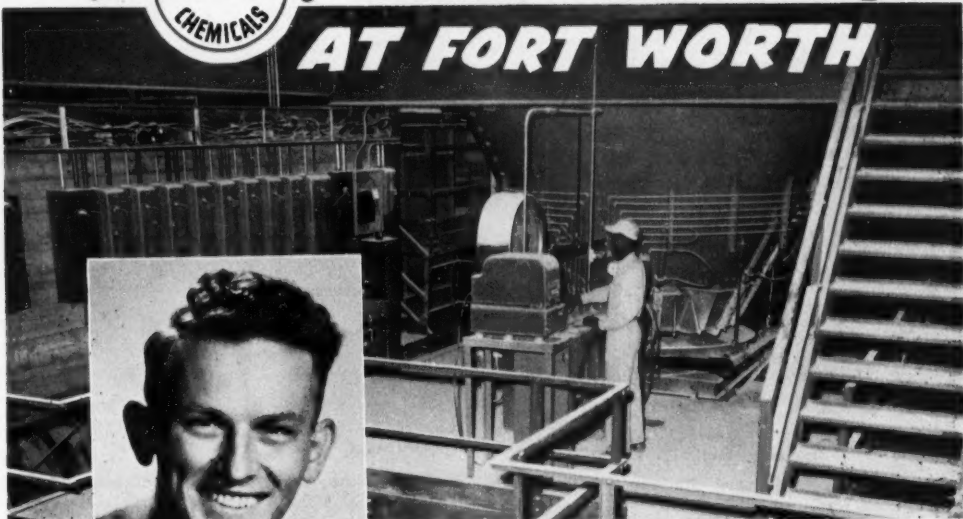
It has been said that the boll weevil was a blessing in disguise—but it is hard for me to subscribe to that line of thinking. Diversification to avoid insect damage is an escape. Diversification certainly has its place, but it should be planned in an orderly manner, not forced by soil depletion or the ravages of insects and diseases. In our agricultural history there have been many instances of insects and diseases forcing diversification, but I am afraid these changes, like many others forced upon agriculture, have been accomplished by heartaches and bankruptcy.

There is abundant evidence that insects and plant diseases have exerted a tremendous influence on southern agriculture in the past. What about the future? We have found better ways to live with insects, but where do we stand with regard to controlling them? Those who dare to estimate say we have lost as much as a billion dollars' worth of cotton to insects in a single year, even though reasonably good controls are available to everyone. In other words, the operation was highly successful, but the patient died!! We have no practical control for the corn earworm in field corn, a major insect pest in southern corn fields. Screwworms still may cause southern stock growers millions of dollars loss in a single season. Vegetable insects and diseases, those attacking our forest resources and our commodities in storage, insects and diseases that work underground, and the harmless-looking little fellows that transmit viruses—all are a continuing but preventable drain on our agricultural production.

Cotton must remain a major cash crop in the South for years to come.



GOES SACKETT AT FORT WORTH



International selects Sackett CUSTOM-ENGINEERED Equipment for the Receiving, Mixed Goods Manufacturing, Superphosphate Milling, Screening and Bag Filling Operations at modern new Texas plant.

Here is what this progressive company voluntarily has to say . . .

We have recently completed a manufacturing program of mixed fertilizer with the machinery furnished by you for our new Fort Worth Plant and wish to take this opportunity to congratulate you on a job well done.

Yours very truly,

INTERNATIONAL MINERALS
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Tentative Schedule for NAC 19th Annual Meeting

Essex & Sussex Hotel, Spring Lake, N. J., September 3-5

Wednesday, Sept. 3

Election of Board of Directors.

10:00 a.m.—Paul Mayfield, VP NAC, General Manager, Hercules Powder Company.

10:10 a.m.—Arthur W. Mohr, Pres. NAC President, California Spray-Chem. Corporation, Richmond, Calif.

10:30 a.m.—Dr. Clair R. Spealman, Chief Safety Projects Branch, CAA—"Medical Aspects of Airplane Dusting and Spraying."

11:30 a.m.—Dr. Paul Sanders, Editor SOUTHERN PLANTER, "Agriculture's Role In The American Story."

6:00 p.m.—Reception.

Thursday, Sept. 4

10:00 a.m.—Dr. H. H. Shepard, Staff Specialist, Office of Materials & Facilities, PMA, USDA—"Summary of Pesticide Requirements for '52-53."

10:20 a.m.—Guests. Introduction of VIP's.

10:40 a.m.—Dr. G. D. Humphreys, President University of Wyoming—"Where To Get Supply Of Technical Personnel."

11:00 a.m.—Dr. Oris V. Wells, Chief Bureau of Agricultural Economics, USDA.

11:20 a.m.—Dr. W. W. Dykstra, Asst. to Chief Branch

of Predator & Rodent Control, Fish & Wildlife Service, Dept. Interior.

Golf Tournament.

7:00 p.m.—Annual Banquet.

Friday, Sept. 5

10:00 a.m.—L. S. Hitchner, Exec. Sec'y, Nat'l Agric. Chemicals Assoc.

10:20 a.m.—Avery S. Hoyt, Chief, BEPQ—"The BE&PQ In 1952."

10:40 a.m.—Dr. George C. Decker, Head, Section of Economic Entomology, State Natural Survey Div.

11:00 a.m.—Panel Speakers: Subject, Exports
Richard L. Davies, Pennsylvania Salt International Corp., Philadelphia, Pa.

Earl R. Beckner, Manufactured Products Staff, Office of International Materials Policy, U. S. Department of State, Washington, D. C.

Phillip H. Groggins, Chief, Agricultural Chemicals Section, Chemical Division, NPA, USDA, Washington, D. C.

Dr. Ralph Stewart, Director, Agricultural Products Division, Office of International Trade, Department of Commerce, Washington, D. C.

Entertainment for Ladies.

Dancing Every Night.

Corn is certain to increase in acreage. This means more livestock. More livestock means more pasture and other feed crops. None of these are free of pests, and in time these pests may prove far more destructive in the South than elsewhere in the country.

The insect problems associated with cotton are some of our oldest. Much progress has been made, but our experience in 1950 proved that much remains to be done. The results obtained from community-wide pest control in large-scale experiments appear to offer some hope of using more effectively, at least

in some areas, the control knowledge we now have.

The Japanese beetle is slowly invading the South in spite of strenuous efforts to retard its spread.

The European corn borer is a relatively new comer to the South. Two generations of borers in the Midwest are bad enough, but three or four, or even five or six generations may prove much worse. The southwestern corn borer, now in Oklahoma and Kansas, may some day infest corn fields east of the Mississippi. As yet we have no answer to that one.

Bad as all this may be, it is after

harvest when the corn is in the crib that southern farmers experience some of their greatest losses. There is experimental evidence that in some parts of the South farm-storage losses up to 9 percent per month are not uncommon.

Actually, the whole problem can be made to look fantastic . . . but that is not my purpose.

While corn has been used as an example, most any other crop would serve the purpose. Corn has its insects and diseases, wheat others.

Grassland agriculture in the South is well beyond the talking stage,

(Continued on page 46)

Magnesium
is the
basic metallic
element

in Chlorophyll

the green substance which captures the
sun's energy that is vital for plant growth

Include Soluble Magnesium in Your Quality Fertilizers

Sul-Po-Mag®

Water-Soluble
Double Sulfate of Potash-Magnesia

*

Magnesium is the basic metallic element in chlorophyll, the green plant substance which captures the sun's energy that is vital for life and growth.

Magnesium concentrates in the seed with phosphorus to aid in the formation of oils and proteins required for viable seed.

Magnesium functions as a carrier of phosphates to the actively growing and fruiting parts of the plant.

Magnesium is required to activate the processes which stimulate the production and transport of carbohydrates and proteins within the growing plant.

Magnesium, in sufficient quantities, enables the plant to utilize other plant nutrients for healthy, disease-resistant growth.

Magnesium stimulates the growth of soil bacteria and increases the nitrogen-fixing power of legumes.

What makes a plant grow? The chemical actions of mineral nutrients, sunlight, water and carbon dioxide. The key to the combination is *chlorophyll*, the green plant substance that is essential for all plant life. Chlorophyll draws from the sun the energy needed for plant growth. Formation of chlorophyll in the plant depends on *magnesium* the only metallic element in the chlorophyll molecule. If insufficient magnesium is available to the plant, a typical deficiency symptom is a yellowing or discoloring between the veins usually first on the lower leaves of the plant. This is a warning signal that the chlorophyll content of the plant is too low to capture enough of the sun's energy for healthy growth.

When you include soluble magnesium in your quality fertilizers prepared for use on soils which are deficient in magnesium, you increase the effectiveness of the other plant nutrients. They will give the plant a healthier start, hasten maturity and increase yield and quality of tobacco, cotton, citrus, corn, small grains, potatoes, vegetables, legumes and other crops.

Many farmers have found by profitable experience that the most practical and economical way to supply soluble magnesium to their soils is with *Sul-Po-Mag*.

Sul-Po-Mag is a properly balanced source of magnesium and potash, both in sulfate form, water-soluble and immediately available to the growing crop. *Sul-Po-Mag* is produced exclusively by International and is supplied for use in quality mixed fertilizers and bagged for direct application to the soil.



POTASH DIVISION

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The use of "PAYLOADERS" is so widespread

that a tremendous amount of application experience has been accumulated so that accurate production and cost figures can be estimated for new applications. You are invited to find out how the "PAYLOADER" can boost production and cut material handling costs in your plant as they have in so many others. The Frank G. Hough Co. 702 Sunnyside Ave., Libertyville, Illinois.

HELP for your material handling problems is in the pages of "Industrial Handling," the free Hough magazine. Catalogs on any size "PAYLOADER" (12 cu. ft. to 1½ cu. yd.) are also available, without obligation.



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Regional Fertilizer Meetings

NORTHWEST

The third annual Pacific Fertilizer Conference, sponsored by the Soil Improvement Committee of the Pacific Northwest Plant Food Association, was held at Pocatello, Idaho July 9-10-11, 1952.

The program was arranged by the Soil-Improvement Committee, George Wickstrom Chairman, with Jack Wursten of the Simplot Fertilizer Co. of Idaho Falls, Idaho making program arrangements at Pocatello.

Morning sessions were held during the three days, with field trips in the afternoon. The first afternoon was spent touring the Simplot Fertilizer Company's phosphate mine; the second afternoon at the Aberdeen (Idaho) experiment station of the University of Idaho; and the third afternoon inspecting the plants of the Simplot Fertilizer Co. and Westvaco Co. at Pocatello.

Henning Waltersdorff, President of the Association, presided at one of the sessions and invited visitors to attend the annual convention of the Pacific Northwest Plant Association November 6 and 7 at the Gearhart Hotel, Gearhart, Oregon. Mr. Waltersdorff announced the appointment of G. Al Fitzpatrick of Portland as general convention chairman, with Bill Chorlton of Portland as program chairman.

The 1953 meeting will be held on the campus of Washington State College, Pullman, Washington and will feature a tour of the Columbia Basin.

Papers were presented by eight well-known agronomists, largely devoted, of course, to the fertilization of Western lands:

Dr. K. D. Jacob, USDA, spoke on phosphate fertilization from this viewpoint, pointing out that in the fiscal year ending June 30, 1951 the 12 Western States consumed fertilizer containing 137,000 tons of available P_2O_5 with a farm-delivered value of more than 23 million dollars, a new record for those states, and four times the 1939 figure.

Dr. Jay L. Haddock, USDA's Utah



At the third annual Pacific Northwest Fertilizer Conference these attending officers were snapped in front of the meeting hotel: Henning Waltersdorff, Washington; Jack Wursten, Pocatello; Dr. M. E. McCollam, San Jose.

station spoke on the relationship between soil moisture and the up-take and effectiveness of plant foods, and pointed out that the value of barnyard manure lies quite as much in its physical effect as in its fertilizing effect.

Rulon D. Lewis, USDA, Wyoming reported on the effect of uncontrolled irrigation which lowered the yield of Wyoming pastures when used in conjunction with improper cultural methods which did not create a proper soil and water relationship. Correction of these factors brought tonnage up from .7 to a 4.7 high.

Lloyd H. Banning, US Bureau of Mines, Oregon spoke on defluorinated phosphate rock as a fertilizer and a stock feed supplement.

Walter C. Sparks, University of Idaho discussed the work of the Aberdeen Branch AES.

Dr. B. R. Bertramson, Washington State College discussed the Dealney Committee report, with commendation for "its scholarly investigation and summary of the relationship of chemical fertilizers to Agriculture."

Dr. Frank Viets, USDA, Washington State Irrigation AES handled the subject of foliar analysis of the minor elements, presenting slides showing deficiency symptoms.

J. L. Wursten, Simplot Soil Build-

ers, discussed the team of phosphate and alfalfa as Western soil builders, and as the key to Western agricultural prosperity.

SOUTH

Some one hundred were present when President Rodney C. Berry, Virginia State Chemist, called to order the meeting at Carlsbad, New Mexico, of the Southern Control officials. A well planned program of meat as well as dessert was worked out by R. W. Ludwick of New Mexico State as chairman of local arrangements.

The program ran over a four-day period, with business meetings on Wednesday and Friday, and a trip to the IM&C potash mine and refinery occupying most of Thursday, and to the famed Carlsbad Caverns on Saturday. A Chuck-Wagon barbecue supplied the center of Wednesday's evening events, with a banquet on Friday night.

The Chuck-Wagon was sponsored by Western Cottonoil Co., Pecos Valley Cotton Oil and Portales Valley Mills. The Banquet was given with the compliments of Duval Sulphur & Potash, IM&C, Potash Company of America, Southwest Potash and U. S. Potash. Entrance fees and luncheon on Saturday's Cavern trip

were compliments of the New Mexico Feed & Grain Dealers Association.

Speakers included Dr. W. T. McGeorge, Arizona AES; S. L. Nevins, Mathieson Chemical; Dr. H. E. Dregne, New Mexico A&M; G. T. Harley, IM&C; Prof. Loren V. Burns, Kansas State Feed Technology School; Dr. Allen Heidebrecht, Western Cottonoil; Dr. Frest W. Quackenbush, Indiana State Chemist; W. E. Flint, New Mexico AES; Park A. Yeats, State Board of Agriculture, Oklahoma; John W. Kuzmeski, Massachusetts AES.

Officers for 1952-53 are:

President: J. J. Taylor, Tallahassee, Fla. Vice-Pres: Parks A. Yeats, Oklahoma City, Okla. Sec-Treas: Bruce Poundstone, Lexington, Ky.

Executive Committee:

President, Vice President, Secretary Treasurer.

Rodney C. Berry, Richmond, Va.; R. W. Ludwick, State College, New Mexico; A. H. Harris, Raleigh, N. C.; E. A. Epps, Baton Rouge, La.; L. C. Jacobs, Nashville, Tenn.

SOUTHWEST

5-State Meeting of Manufacturers and Dealers

More than 100 manufacturers, distributors and dealers took advantage of the grade hearing at Galveston July 9-11 to hold a simultaneous meeting representative of Arkansas, Oklahoma, Louisiana, Texas and New Mexico . . . the consensus of which was that the years ahead are to be bright years as the farmers strive to fill that Fifth Plate at the American dinner table.

Speakers included Jack Rutland, International Minerals & Chemical Corp., Chicago; NFA President, Russell Coleman, Dave Weatherly of the John J. Harte Co., Atlanta.

Mr. Rutland pointed out the importance of a fertilizer dealer being familiar with his merchandise as a way to better sales now and in the future. If he can recommend specific grades for specific soil problems, the farmer will come back to him year after year.

Russell Coleman spoke of the increasing demand for fertilizer in the years ahead—a bright picture for the future.

Dave Weatherly spoke of modern building methods used in the fertilizer field, to achieve better and more efficient production.

SOUTHEAST

GEORGIA SOCIETY GETS QUICK ACTION ON GRADE CHANGES

At meetings in Statesboro, July 22 and Tifton July 23, sectional meetings of the Georgia Plant Food Educational Society passed a resolution asking that fertilizer grades be reduced to 15 in number, with a minimum plant food content in any grade of 20 units per ton of mixed fertilizer containing the 3 major plant food elements.

GEORGIA GRADES

8-8-8	4-8-8
6-8-6	0-12-12
5-10-10	0-10-20
5-10-5	0-16-8
4-12-12	14-0-14

For tobacco use
3-9-9 (on old land)
3-12-8 (on new land)
For tobacco beds only
4-9-3

The meetings which were virtually identical in format with the first two, reported here last month, were well attended and prove again the strength of the Educational Society idea.

The resolution, as approved, reads as follows:

BE IT RESOLVED by members of the Georgia Plant Food Educational Society attending the Fertilizer Conferences for Districts 3 & 4 of the Society at Statesboro, Georgia, July 23, 1952; and Tifton, Georgia July 23, 1952 respectively:

1. That the Society thank Dr. O. C. Aderhold, President of the University

of Georgia, for the cooperation of the University which contributed bountifully to the success of the Fertilizer Conference and short courses held in June and July of this year. Particularly appreciated were A. The services of Assoc. Dean Paul W. Chapman and Prof. W. O. Collins of the College of Agriculture; Mr. E. D. Alexander of the Agricultural Extension Service; various personnel from the Agricultural Experiment Stations, College of Agriculture and Extension Service who served on the Panels; and the Extension District and County Agents who helped with attendance and arrangements; and

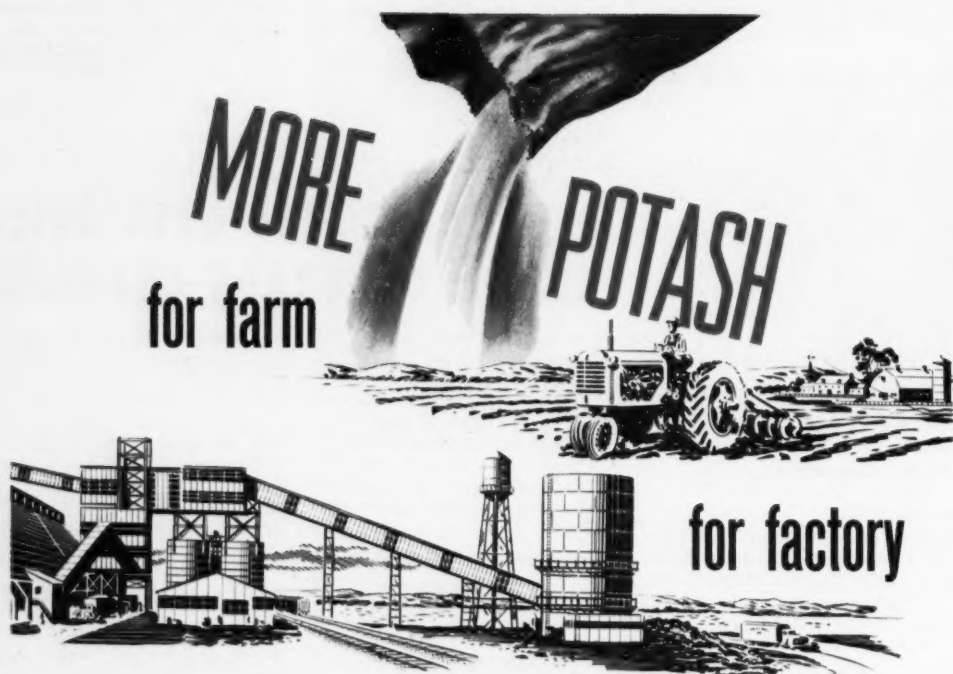
B. The facilities of the Fulton County 4-H Camp, the College of Agriculture, the Georgia State Teachers' College, Abraham Baldwin Agricultural College, the Coastal Plains Experiment Station, and the Southeast Georgia Experiment Station at Midville, Georgia.

2. That the Society request the Dean of the College of Agriculture to appoint a small (5 to 7 persons) representative committee from the teaching staff, Experiment Stations and Soil Testing Labs, and from the Agricultural Extension Service to meet at an early date with a committee of the Georgia Plant Food Educational Society and representatives of the State Department of Agriculture for the purpose of

A. Determining what grades and ratios of fertilizer will adequately meet the general agricultural needs of Georgia farmers in 1952-53.

B. Making efforts to limit this number to no more than 15 grades, the

(Continued on page 64)



from
The Modern, New Carlsbad, New Mexico Plant And Refinery of

DUVAL

Sulphur and Potash Company

Address all communications to

ASHCRAFT-WILKINSON CO.

Exclusive Distributors

ATLANTA, GEORGIA

Cable Address ASHCRAFT

NORFOLK, VA. • CHARLESTON, S. C. • TAMPA, FLA. • GREENVILLE, MISS. • COLUMBUS, OHIO

your advance SALESMAN

FOR FERTILIZER IN COTTON PRINT BAGS

This dominant ad will appear in:

PROGRESSIVE FARMER
FARM & RANCH with
Southern Agriculturist
CAROLINA COOPERATOR
COOPERATIVE FARMER
SOUTHERN FARM & HOME
SOUTHERN PLANTER

Yes, farm families will be looking for Fertilizer in COTTON PRINT BAGS this fall, and at the same time, they'll be thanking the manufacturer who packs in Cotton Bags for making it possible to recover container costs . . . in valuable Cotton Cloth.

MANUFACTURERS — write for complete details on how to use this campaign on Cotton Print Bags to increase your sales.

OVER 4,000,000
COUPONS THAT
SELL YOUR BRAND!

DEALERS — write for 6 free copies of Pattern Service, the Cotton Bag sewing booklet that sells more fertilizer for you in Cotton Bags.

NATIONAL COTTON COUNCIL • P. O. BOX 76 • MEMPHIS 1, TENNESSEE

BUY FERTILIZER IN

cotton print bags

GET 21½ YARDS OF SEWING
MATERIAL WITH EVERY TON

ENOUGH FOR FIVE SMART DRESSES



Think of it... FIVE dresses with each ton of fertilizer you buy in Cotton Print Bags. Your progressive fertilizer manufacturer helps you recover container costs by packing his product in re-usable Cotton Bags — dress prints, quality sheeting, and serviceable toweling. Regardless of what the container is made of, YOU, the customer, are the one who pays for it! Why pay for bags that are a dead expense? Insist on Cotton Bags and get back the entire container cost in valuable sewing material.

Buy your fertilizer in Cotton Bags . . . and save money by the ton!

Free PATTERN SERVICE for Sewing with Cotton Bags



This valuable booklet will be sent to you with the pamphlets of your manufacturer who packs his product in Cotton Bags. Just mail the coupon with your name and address, the brand name of the fertilizer you buy, and your dealer's name and address.

NATIONAL COTTON COUNCIL

P. O. Box 76, Memphis 1, Tennessee

Send me Pattern Service for Sewing with Cotton Bags.

Name _____

Address _____

City _____ State _____

Brand of fertilizer I prefer _____

My dealer's name and address _____

Personals...

Arnon L. Mehring, whose 38 years with the USDA were largely devoted to fertilizer, will devote his retirement to more of the same on problems that interest him especially. So we may expect many more important things to come from his pen, as he takes his postman's holiday at Hyattsville, Maryland, where his home is located.

F. F. Buhner, president of **Buhner Fertilizer**, has made a centennial gift of \$5,000 to the Schneck Memorial Hospital, Seymour, Indiana, of which community the Buhner plant is one of the oldest concerns. **Phillip R. Smith** has left Purdue to be technical officer of Buhner Fertilizer at Louisville, Kentucky.

Raymond Ross Paty, former president of the University of Alabama, and later Chancellor of the University of Georgia has become a member of the TVA Board of Directors, and will emphasize soil conservation in the TVA region.

William R. Thurston, **Thurston Chemical**, Joplin, Missouri is the subject of a "profile" in a current issue of "Washington Report" weekly newspaper of the US Chamber of Commerce, of which he is a newly elected director. It tells of his beginnings at the **American Chemical Company** plant in Charleston, South Carolina, and how he decided to go West, choosing Joplin because **Atlas Powder** had a sulphuric acid surplus. He had saved \$50,000 and was able to borrow \$100,000 from Charleston friends.

Overcoming the reluctance of the Missouri farmer to use fertilizer, he prospered from the first, and soon repaid his Charleston friends. He expanded to Tulsa and to Trenton, Missouri and Lawrence, Kansas, as our readers know, and is currently working out a \$2,500,000 expansion program in Joplin. All this in 10 years.

The BEM brand was derived from the initials of his children. The "Brings Extra Money" slogan came later.

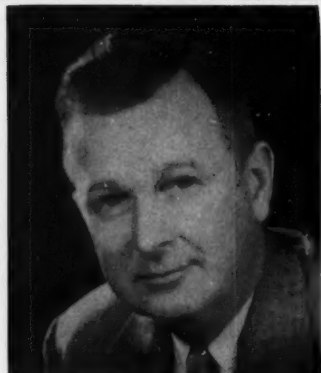
Vincent Sauchelli, **Davison Chemical**, is author of a letter in the July 19 issue of *Collier's* magazine pointing out an error which made a writer say that American farmers spend seven billion annually for mineral fertilizers. Collier's in a footnote admitted the error.

John R. Clements has been made Midwest sales manager for the multiwall bag division of **Albemarle Paper** with Chicago headquarters.

Dr. M. F. Fogler, executive vice-president of the **Nitrogen Division**, speaking at a reception in Omaha, said the Division's 61,700 annual tons of nitrogen at Omaha would be the equivalent of increasing US acreage 1,500,000 acres. The urea production there will be for fertilizer and feed, too.

John C. Carrington, who joined them in 1939, has been made vice-president of **Freeport Sulphur**.

Travis P. G. Barham, formerly in **St. Regis Sales Corporation's** production division, (Franklin plant) has joined their Southeastern Sales



R. K. Goodhue, who has been appointed Akron district sales manager by Stauffer Chemical. He has been with them since 1942.

district and will be attached to the Atlanta office.

Richard A. Berger, after 11 years with **St. Regis Paper**, has joined **Kraft Bag** as administrative assistant in the New York office, and handling multi-wall sales in New York State, except the City of New York.

Alfred J. Dickinson, Jr., with them since 1939, has been elected a vice-president of **Virginia-Carolina**.

Chase Bag Company, early last month, played host to three distinguished personalities, young French executives who are visiting America under the auspices of the Mutual Security Agency. They are: **Jean Jacques Berson** of the Ministry of Finance; **Jean-Louis Brisson**, manager of **Weill & Co.** Parisian jute mill; **Michel Serge Stein**, of the Ministry of Industry.

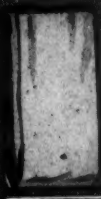
Last month we told of the award of first place in the National Industrial Advertising Association convention to The Frank G. Hough Co. advertising manager and advertising agency. Here is a picture taken at the time, showing ad-manager Raymond P. Wiggers being congratulated by Col. Russell L. Putman, donor of the award, while advertising counsel Ervin R. Abramson and Ray B. Thomas look on.



DEPENDABLE as a source... **DEPENDABLE** as a service



Flat
Draw
Open
Mouth



Draw
Open
Mouth



Draw
Open
Mouth

KRAFT BAG MADE-TO-ORDER HEAVY-DUTY



Draw
Open



Draw
Open



Draw
Open
Valve

MULTI-WALL SHIPPING SACKS

2 to 6 ply
plain or
printed
1 to 4 colors

Custom-made to fit your specific needs, Kraft Bag Multi-Wall Shipping Sacks render full value in service—deliver full value to your customers...flexible in filling, rugged in handling, tough in transit, they empty c-l-e-a-n, with less dusting or sifting!

**3 GENERATIONS
OF BAG SPECIALISTS**

SELF-CONTAINED • SELF-SUSTAINING

producing our own pulp and paper and other components in our own integrated plants, at Gilman, Vt. and St. Marys, Ga.

*There is no substitute
for kraft!*



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BAG
CORPORATION**

GILMAN PAPER COMPANY SUBSIDIARY
630 Fifth Avenue, New York 20, N.Y.
Daily News Bldg., Chicago 6, Ill.

If your product fits into a bag — we'll make the bag to fit your product.

Mr. and Mrs. Louis Ware are in the midst of a 60-day tour which will bring them home again September 2, visiting foreign offices and customers of **International Minerals & Chemical**, stopping in San Francisco, Honolulu, Tokyo, Manila, Hongkong, Bangkok, Calcutta, Delhi, Bombay, Karachi, Beirut, Istanbul, London, New York—and back to Chicago. **Samuel P. Marshall, Jr.** has been appointed district sales manager of International's Buffalo, New York, district.

William H. Ward, Dupont vice-president, has been elected board chairman of the **Manufacturing Chemists Association**.

Dr. Bruce D. Gleissner, with them since 1944, has become manager of the **American Cyanamid** insecticide department.

H. H. Tucker, president of the **Coke Oven Ammonia Research Bureau**, has succeeded **H. B. Siems** as chairman of **NFA's Plant Food Research Committee**.

D. F. Bradley now heads the Detroit sales office for **Shell Chemical**, succeeding **W. E. Keegan** now assistant to the vice-president in charge of marketing.

George J. Odum has been made chief chemical engineer of **Northern Chemical Industries** operations at Searsport, Maine, according to word from **J. E. Totman**, president. He has been for 29 years with **Monsanto's Merrimac Division**, and is a recognized authority on the manufacture of sulphuric acid, sulphate of alumina and other heavy chemicals.

George K. Whyte is the new manager of the Chase Factory and Sales Office in St. Louis. **R. N. Connors**, vice-president and general sales manager, Chase Bag Co., has announced. He has had ten years of selling experience with Chase.

New officers were named at the annual meeting of the Industrial Bag & Cover Association in Home-

stead, Virginia. **H. C. Davis**, Manager of the Bemis Bro. Bag Co. Paper Specialty Plant in St. Louis, was elected President of the Association, and **S. G. Yount**, President of the Southland Paper & Converting Co. of Los Angeles, Vice-President for the year ending June 1953. **P. O. Deitsch** of New York City was elected Secretary, Treasurer and Administrative Officer.

Irving D. Dawes, vice president and treasurer, Virginia-Carolina Chemical Corp., Richmond, has been named a director of the Richmond Control of the Controllers Institute. **Glenn L. Morrison**, controller, Central Chemical Corp., Baltimore, was similarly honored by the same organization's Baltimore Control.

John B. Trotter's appointment of Birmingham, Alabama, as manager of aroclor and special chemicals sales for **Monsanto Chemical Company's** Phosphate Division in St. Louis was announced by **Tom K. Smith Jr.**, general manager of sales for the division.

INSECTS

(Continued from page 30)

but we have little knowledge of the total insect problem in relation to grasslands. There are white grubs and wireworms, and the Japanese beetle now in North Carolina will probably become a problem over much of the South. We have little knowledge of the species of importance to improved pastures, how much damage they may do or what we can do about them. This is an important field urgently in need of investigation.

Our planning for the future, in my opinion, must include more attention to the intermediate steps between the research man and general adoption of recommended pest-control practices by the growers. A farmer can practice good tillage methods, apply fertilizer according to need, and rotate his crops scientifically without regard to his neighbor, but insects and diseases, more often than not, require area-wide action for best control.

Locally organized pest-control dis-

tricts promise a partial solution to this problem. Good pest control is becoming a highly technical job. We must learn to think more in terms of prevention. Local associations of farmers who apply recommended control measures, at the right time, in the right places, and on a community-wide basis, will accomplish much in this direction.

We are rapidly reaching the point in this country when we must meet our steadily increasing agricultural requirements without increasing acreage devoted to crops. This involves increased fertility, better land management, and new and better crop varieties. Most of all, we need better crop protection. Effective pest control means more and better quality food, feed, and fiber without increasing acreage, seed, fertilizer, manpower, or equipment.

There is need for coordinated crop-protection service in this country, one that utilizes the full potential of our entomologists, plant pathologists, plant breeders, agricultural chemists, and the engineers, all of whom are concerned with better ways of protecting our crops from the time the seed is planted until the processed commodities are consumed.

OBITUARIES

Eugene C. Auchter, 62, former chief, Bureau of Plant Industry, USDA, July 8 at his home in Honolulu after a long illness.

Robert Sydney Cope, 81, for 42 years president of Reliance Fertilizer Company, Jacksonville, Florida, June 19, after a brief illness.

J. C. Fowler, 74, who retired from Wilson-Toomer Fertilizer Company in 1945 after 16 years with them, June 11, at his home in Montgomery, Alabama.

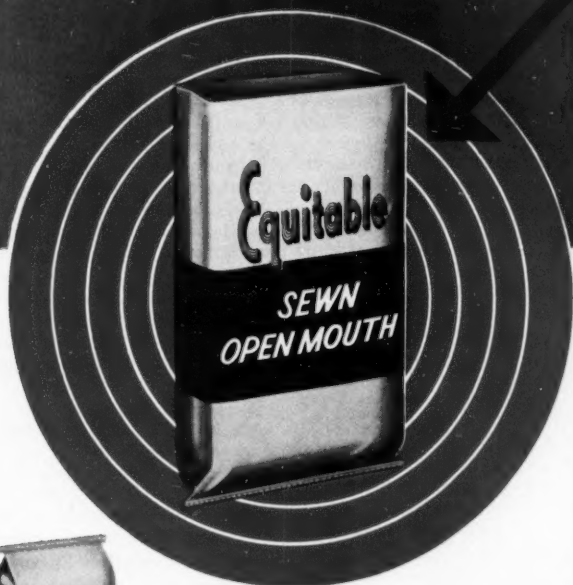
Henry J. Kleinfeldt, vice-president of Abbe Engineering Co., New York City, died June 6 after a two-year illness. He had been with the concern for more than 40 years.

J. Bailey Pratt, Jr., 61, a senior executive of H. J. Baker & Bro., New York, died July 11 at Manchester, Vermont.

those who want the best
set their

sights on

EQUITABLE MULTIWALL BAGS



Every month, the list of fertilizer packers who have switched to Equitable keeps growing. Why? Because there's a BIG difference when you deal with this outstanding leader in the paper bag field! Here are just a few of the "plus values" that will add up to greater economy, efficiency and satisfaction in your packing operation:

QUALITY — Starting with special kraft paper made in our own mills, we use the very finest and latest equipment and quality control techniques to guarantee that your multiwall bags are perfect in every detail of your specifications.

PRINTING — Equitable's modern four-color printing process equipment prints sharp, bright colors with amazing fidelity and careful registration. The services of our design artists are available without cost or obligation.

PERSONAL SERVICE — Equitable is big in terms of modern machinery but not too big to give your individual job personalized executive attention at every step of production.

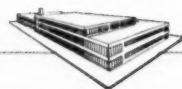
DELIVERY — You want the right bag when you want it. And with Equitable, you are always assured of prompt, dependable delivery!

SPECIFICATIONS — Equitable Multiwall Bags are available in any combination of papers you require — 2 to 6 plies — plain or printed in 1 to 4 colors.

*We'll be glad to rush you quotations.
Let us know your requirements . . .*

Equitable

PAPER BAG COMPANY



45-50 VAN DAM STREET
LONG ISLAND CITY 1, N. Y.

PAPER MILLS AND SOUTHERN BAG PLANT: ORANGE, TEXAS

THE ROLE OF PLANTS IN THE PRODUCTION OF SYSTEMIC INSECTICIDES

By JOHN E. CASIDA
University of Wisconsin

Plants have long been known as good producers of insecticides. The highly effective nicotine, pyrethrum and rotenone are examples of natural insecticidal constituents produced by plants. It was not known until recently that the plant may also produce insecticides from certain synthetic organic compounds. Octamethylpyrophosphoramide, commonly known as OMPA, is one such chemical. OMPA is non-toxic until it is applied to the plant. The living tissues then change it to a toxic material. Thus the plant converts OMPA into an insect poison.

OMPA is one of a group of systemic insecticides discovered during the war by the German chemist Schrader. These chemicals are absorbed and translocated by the plant making it toxic to plant-feeding insects. A single application to the soil or foliage may protect the entire plant from damage by certain insects for over a month. Treatment of the seed also affords protection against insect attack. OMPA is now used commercially in England and the United Kingdom and is being tested for use in this country.

The plant is an important factor in determining the effectiveness of systemic insecticides. Recent studies by members of the Entomology Department at the University of Wisconsin emphasized this fact. Field peas and pea aphids were used in their studies. It was shown that the peas converted OMPA into a new toxic product more effective than the applied chemical. This toxicant was determined by its ability to block the action of cholinesterase, an enzyme vital in the functioning of the animal nervous system. Besides plants, isolated liver preparations from a number of mammals were found to produce the active toxicant. The chemical nature of the "active

material" is now being investigated at Wisconsin.

Phosphorus was also shown to play an important role in the effectiveness of OMPA. When OMPA was destroyed by the plant, phosphate was an end product. OMPA was found to stimulate plant growth. But this stimulation was due to causes other than nutritional phosphate derived from OMPA. The ability of the peas to absorb OMPA through the roots was hindered by soil phosphorus. This was true only for soil application and not for seed or foliage application. Soil phosphorus had apparently affected the ability of the roots to absorb OMPA. Their experiments indicated it may be necessary to increase the amount of OMPA used in the soil where the phosphorus level is high.

OMPA was toxic to the plants at high concentrations. This toxicity was shown to be intimately related to the inorganic phosphorus present in the plant and to certain enzyme systems. Similar chemicals which are less toxic to the plant might serve as a good source of nutritional phosphorus. A thought for the future lies in the development of chemicals which, with a single application to the plant, will serve as a phosphorus fertilizer and will effectively control the insects attacking the plant.

Cotton Weed Control Booklet Offered Free

The University of Tennessee has published and offers free a booklet on chemical weed control methods for cotton. It covers the subjects of preemergence sprays, post emergence sprays, cultivation, flaming, spray equipment, and precautions. The treatment is elementary in nature, designed as an introduction to chemical spraying work, rather than as a specific instruction sheet but farmers who are unacquainted with weed control work will find it interesting.

The paper was prepared by J. K. Leasure of the Experiment Station, Knoxville.

Pennsalt Announces New Allied Chemicals

Pentrete, a new liquid seed disinfectant for wheat, barley, oats and flax for spring wheat growing areas, is now being marketed in limited quantities by the Pennsylvania Salt Manufacturing Company.

Containing a true water solution of phenyl mercuric ammonium acetate as the active ingredient, Pentrete offers efficient seed treatment together with improved processing conditions.

Although designed for use in slurry machines, the water-soluble seed treatment product eliminates slurry and thereby avoids formation of flying dust and dangerous fumes during treating operations.

Because it is used in true liquid form, Pentrete assures complete and uniform coverage over all seeds with which it comes in contact. Use of a dye in the formulation permits ready identification of treated seeds

Pennsalt Marketing Endothal Defoliant This Season

Endothal, believed to be the first complex organic chemical compound successfully used for defoliation, is being marketed this season in limited quantities by the Pennsylvania Salt Manufacturing Co. and by Pennsalt of Washington as Pennsalt Endothal Defoliant S-4069.

The agricultural applications of endothal (disodium 3, 6-endoxohexahydrophthalate) were discovered early in 1948 by Sharples Chemicals, Inc., a subsidiary of Pennsalt. Since that time endothal has been extensively field tested, and while this program is being continued through the present growing season, it has developed far enough so that definite commercial uses have proved practical.

Basic endothal is being manufactured and formulated into various products ready for field use at the Sharples Chemicals plant at Wyandotte, Mich. Sales of Endothal and

Pentrete are being handled through Pennsalt's Agricultural Chemicals Department, 1000 Widener Building, Philadelphia 7, Pa., and by Pennsalt of Washington at Tacoma.

Free Sample Weather Map

Accurate, long-range weather forecasting, a comparatively new science, and formerly a service only available to a few at high cost, is now available to all for pennies in the form of a monthly weather map, put out by Blewett Weather Service, pioneer Climatological-Meteorological research concern, which predicts weather conditions 30 days in advance for each month of the year—by days, cities and areas in the United States! In addition, expected rainfall and anticipated average temperatures are provided—by cities!

Chase Bag Gets 100-Year Certificate

At a luncheon held in New York, Mayor Impellitteri presented President F. H. Ludington of Chase Bag Company a certificate of business merit, as one of the concerns which have done business in New York for a hundred years or more.

Kentucky No Longer Supplies Analysis Tags

Beginning the first of last month, Kentucky abandoned the practice of supplying guaranteed analysis tags for fertilizers, and now requires the manufacturer to supply his own tag, or to print the information directly on the bag. Bulk sales invoices must be accompanied by a guarantee in the same terms as would be printed on bags or tags.

Bemis Promotes Voting Via Educational Comics

Recognizing the urgency of a big vote in the forthcoming national elections, Bemis Bro. Bag Co. is issuing a series of educational comic books, first tested in their own ranks, and then offered to others on a low-cost basis. These are being

featured in the Bemis national advertising program, and free samples are offered to those who will write them at 408 Pine Street, St. Louis 2, Missouri.

Deep Plowing Renovates Land

In Grady County, in central Oklahoma, according to the Farmer-Stockman, custom deep plowing with special heavy-duty machinery, is break-

ing up waterproof plow pan and increasing yields on worn out soils. One such plowing is said to be effective from ten to 20 years.

Chemistry Bureau Report Available

The annual report of the California Bureau of Chemistry for 1951 is now available without charge. Write 243 Mull Building, 1125 Tenth St., Sacramento, California.

THE WEBSTER FERTILIZER BUCKET



- Specially designed to handle fertilizer wet or dry. Webster engineers have provided more metal at points subjected to most strain and wear for extra months of service.
- Webster malleable iron fertilizer, combination steel and malleable chains and sprockets give longer, trouble-free performance under severe operating conditions. Enjoy less downtime; specify Webster equipment for your next replacement installation or your original equipment purchases.

WEBSTER MANUFACTURING, INC.

DEPT. F852

TIFFIN, OHIO



● Write for free folder describing the Webster Fertilizer Bucket. It fully explains its improved design and performance. No obligation, of course!

DAVISON



1. STORAGE CONTROL—will not cake or lump while in storage.



2. APPLICATION CONTROL—drills free, and even . . . does not bridge over in the drill.



3. FOOD CONTROL—supplies uniform amount of plant food at desirable rates.

Davison's Granulated Superphosphate with 3-way control can mean added sales for you!

No longer is it necessary for you or the farmer to worry about lumping or caking . . . Davison's Granulated Superphosphate will store without becoming hard or caked. And when the farmer starts to apply Granulated Superphosphate in the field he will find there is no dusting nor will it bridge over in the drill. Granulated Superphosphate drills freely and evenly giving complete coverage. Because of the granular structure, plant food is released at desirable rates.

For added sales points be sure to get *Davison's Granulated Superphosphate with the 3-way control!*

Progress Through Chemistry

THE DAVISON CHEMICAL CORPORATION

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*It gives you a better product that is
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TOMBSTONING now doomed with Aquafil as your conditioning agent. Two years research and scientific pilot tests proved that Aquafil is 4 times as effective as old fashioned conditioners. This means a more uniform, a more concentrated product... at less cost. Using smaller portions of Aquafil also brings you savings in handling labor. Aquafil is the best modern conditioner for all mixed fertilizers, for it gives you a better product that is uniform bag by bag... AT LESS COST!

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TESTED IT... CALL IT THE

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At last you can now have complete control of your product. Each bag is the same... and there are no more nightmares about tombstoning.



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GET ON THE BALL NOW
SEND COUPON FOR MORE PROFITS

GET all the
FACTS

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96 B Avenue N.E., Cedar Rapids, Iowa

Please send me, at once, your new folder telling how I can up profits by using Aquafil in my mixed fertilizer operations.

Name

Address

City..... State.....

Safety...

J. Lauren Shopen, of Consumers Cooperative Association, Kansas City, Missouri, publicity chairman for the Fertilizer Section of the National Safety Congress sends this program with the comment that unlike the weather, about which everybody talks and nobody does anything, the Fertilizer Industry is very active . . . as our readers should be well aware.

MEETING FERTILIZER SAFETY SECTION

NATIONAL SAFETY COUNCIL
SHERATON HOTEL, CHICAGO

Tallyho Room, October 22, 1952

2:00 to 2:15 p.m.—“OPENING REMARKS” by General Chairman J. S. Fields, Safety Director, Phillips Chemical Co.

2:15 to 3:00 p.m.—“WHY SAFETY” by J. L. Rosenstein, Ph.D. Head of Dept. of Psychology, University of Miami.

3:00 to 3:20 p.m.—“MULTIPLE SHOT BLASTING IN FERTILIZER STORAGE” by Mark Withey, Explosive Expert, Trojan Powder Co.

3:20 to 3:30—Discussion.

3:30 to 3:50 p.m.—“FIRE PREVENTION FERTILIZER PLANTS THROUGH DESIGN” by G. G. Blair, Fire Prevention Eng. Ebasco Services, Inc.

3:50 to 4:00—Discussion.

Boulevard Room, October 23, 1952

8:30 to 11:30 a.m.—DEMONSTRATION OF MULTIPLE SHOT BLASTING IN FERTILIZER STORAGE

AGE. International Minerals & Chemicals Corp. Chicago Heights, by Mark Withey, Trojan Powder Co.

2:00 to 2:15 p.m.—ELECTION RESULTS OF NEW OFFICERS. 1953 GOALS FOR FERTILIZER SECTION. J. S. Fields, John E. Smith, Safety Director, Spencer Chemical Co.

2:15 to 2:30 p.m.—DISCUSSION OF MULTIPLE SHOT BLASTING, Mark Withey.

2:30 to 2:50 p.m.—HOUSEKEEPING IN FERTILIZER PLANTS. E. O. Burroughs, Jr., Manager Ins Dept., F. S. Royster Guano & Co.

2:50 to 3:20 p.m.—GAS AND DUST CONTROL. Herbert Walworth, Lumberman Mutual Casualty Co.

3:20 to 3:50 p.m.—“HOW TO CONDUCT A SAFETY MEETING.” T. J. Clarke, Personnel Mgr., G. L. F.

3:50 to 4:20 p.m.—“FIRE PREVENTION IN FERTILIZER PLANTS THROUGH MAINTENANCE.” G. G. Blair, Fire Prevention Engineer, Ebasco Services, Inc.

SAFETY NEEDS CONTINUOUS PROMOTION

By J. E. BEDFORD

Associate Professor of Management
Armstrong College, Belkley, Calif.

A review of the safety record of any fertilizer and insecticide plant will reveal that the accident rate will be held down immediately following a safety training program. Then, suddenly accidents will start to happen all over the plant and the accident rate will be as high or higher than before the safety program was put into effect.

Why?

Usually it is because the newness

of safety has worn off around the plant. Workers and supervisors have fallen back into their old habits . . . they neglect to keep practicing the safety rules covered in the initial safety training program.

When the accident rate starts to climb, plant management is apt to consider the safety program a waste of time and money and discard it. This may pare a few dollars from evident overhead, but the hidden cost of accidents will remain—lost time, lower production, and lower morale.

Progressive fertilizer and pesti-

cide plants do not discontinue production when sales decline. They put more effort into promotion. This may include more aggressive selling, more extensive advertising, or reaching out for a new market or presenting a new product to an old market. But, it is promotion—not stopping!

Safety programs need a “shot in the arm” to keep them at top efficiency and to keep the accident rate at a low level. Here are some ideas other fertilizer and insecticide plants have found helpful in promoting their safety programs:

(Continued on page 61)



T. W. Allen is president and general manager of Sand Mountain Fertilizer Company, Attalla, Ala.



At the foot of Sand Mountain, this modern plant is the home of high grade *Mountain Brand* fertilizers. Distributed in North-

eastern Alabama, Sand Mountain, like many well-known manufacturers, depends upon Spensol (Spencer Nitrogen Solutions).

Sand Mountain Fertilizer... ...Another Spensol User



From conveniently located plants, Spencer supplies Spensol (Spencer Nitrogen Solutions) to America's leading fertilizer mixers. More than ever these mixers are finding that Spensol gives well-conditioned, low-cost fertilizer.



A production problem? Let Spencer's Technical Service Department advise you. This staff of experts is at your service without cost or obligation. Even if you're not a Spensol customer, take advantage of this free Spencer service.



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America's Growing Name in Chemicals

Program

National Joint Committee on Fertilizer Application
Held in Conjunction with Meeting of
American Society of Agronomy
The Netherland Plaza Hotel, Cincinnati, Ohio
November 17, 1952

THEME: KEEPING UP WITH KING CORN

Morning Session

10:00 a.m.—Opening remarks—R. L. Carolus, General Chairman.

10:10 a.m.—King Corn of the Future—L. L. Huber, Pennsylvania Agricultural Experiment Station (A Panel).

11:20 a.m.—The King's Diet—J. D. Sayre, Ohio Agricultural Experiment Station.

12:00 noon—Adjourn for lunch.

Afternoon Session

1:30 p.m.—My Experiences with Fertilizer—Roswell Garst, Farmer

Extraordinary, Iowa.

2:00 p.m.—King Corn's Friend—George V. Taylor, Spencer Chemical Company.

2:45 p.m.—Royal Treatment for King Corn—A Panel:

H. B. Siems, Moderator, Swift & Company, Firman E. Bear, New Jersey Agricultural Experiment Station; M. L. Jackson, Wisconsin Agricultural Experiment Station; W. C. Johnstone, Kentucky Bankers Association; B. A. Krantz, U. S. Department of Agriculture.

3:45 p.m.—Adjourn.

mechanization as the most important single problem in cotton educational work at present.

"The farm equipment and chemicals industries have given us a host of new machines and materials, over the span of a few years," Mr. Durand explained. "On the other hand, there is too little understanding of the full implications of mechanization and related developments at the farm level. More men are needed with specialized training which will enable them to aid farmers in putting mechanization into efficient and effective practice."

He explained that the Foundation is the means of participation in the cotton program by such groups as farm machinery manufacturers, railroads, utilities, steamship companies, commodity exchanges, chemical and insecticide manufacturers, fertilizer manufacturers, banks, gin and oil machinery firms, distributors of farm equipment and supplies at the local level, and all groups serving and benefitting from the cotton industry.

"Each of these groups," Mr. Durand said, "has a definite stake in the future of cotton, but because membership in the National Cotton Council is limited to the raw cotton industry, none has been able to participate directly in cotton's industrywide program."

"The Oscar Johnston Foundation offers these allied groups the opportunity of furthering organized cotton's efforts in the broad fields of research, education and promotion. As cotton benefits from these efforts the industry's suppliers are certain to receive proportionate benefits in the form of increased sales of supplies and services."

Kentucky Launches Agricultural Council

After a year of study by the Agriculture committee of the Kentucky Chamber of Commerce, a Council has been set up to coordinate all forces working toward the improvement of Kentucky's farms. J. O. Matlik, editor of *The Kentucky Farmer*, is chairman.

FARM SUPPLIERS WORK WITH FOUNDATION

Initiation of the Oscar Johnston Cotton Foundation's program of basic cotton research and education has been announced by A. L. Durand, Chickasha, Okla., chairman of the Foundation's board of trustees.

Mr. Durand's announcement followed closely the adoption of two major projects—one in the field of research and the other in education—by the organization's trustees at a meeting in Memphis.

The Foundation's first research project will be directed at developing better means of combatting the pink bollworm which is recognized as one of the greatest threats to cotton production across the Belt.

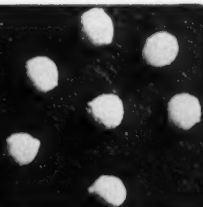
The initial project in education is aimed at providing the farmer

needed assistance in effectively utilizing the complicated methods and machines which are becoming available for cotton production.

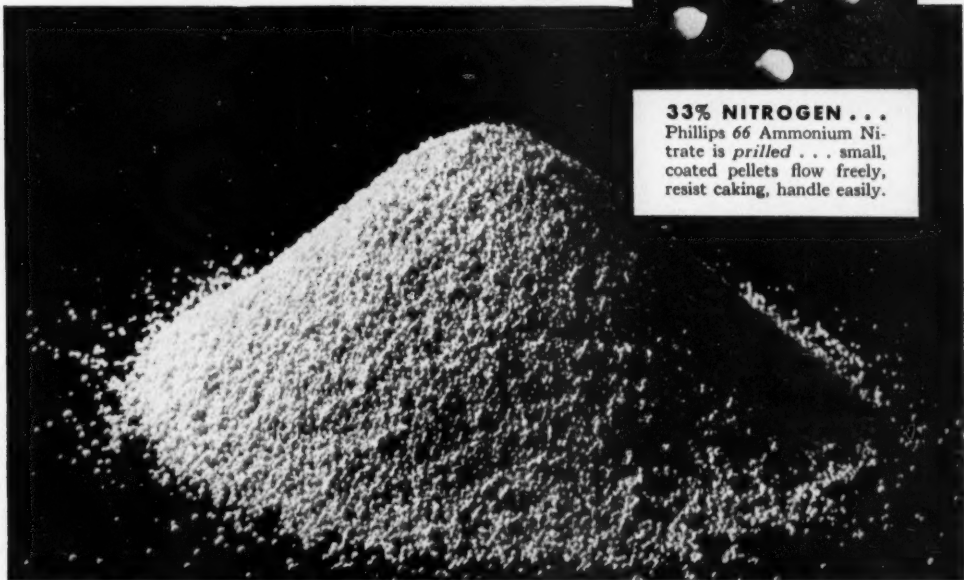
The alarming spread of the pink bollworm and its serious threat to the future of the American cotton industry caused the Oscar Johnston Foundation to give top priority to basic research to develop improved control methods, Mr. Durand said. The Foundation's activity will be conducted in close cooperation with pink bollworm research of all other private and public agencies.

Discussing educational aspects of the cotton organization's program, Mr. Durand stated that the Foundation regarded strengthening of adult education in the field of cotton

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33% NITROGEN . . .
Phillips 66 Ammonium Nitrate is *prilled* . . . small, coated pellets flow freely, resist caking, handle easily.



Nitrogen is in great demand. Even Phillips tremendous capacity isn't equal to today's requirements. But we're making four different kinds of high-quality nitrogen material for mixers and farmers.

1. AMMONIUM SULFATE . . . Phillips 66 Ammonium Sulfate contains 21% N. Flows freely, resists caking. For high-analysis mixed goods or direct application.

2. NITROGEN SOLUTIONS . . . there are three Phillips 66 Nitrogen Solutions for use in the preparation of high-analysis fertilizers and the ammoniation of super-phosphate. These solutions keep handling costs low . . . promote rapid, thorough curing.

3. ANHYDROUS AMMONIA . . . Phillips 66 Agricultural Ammonia contains 82% N. Convenient, economical source of nitrogen for fertilizers.

4. AMMONIUM NITRATE (see photograph and description above).

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OMAHA—WOW Bldg. • AMARILLO—First National Bank Bldg. • LOS ANGELES—4521 Produce Plaza West • BARTLESVILLE—Adams Bldg.

POTASH DELIVERIES SET NEW RECORD

Potash deliveries in North America reached a record total of 1,755,140 tons K₂O during the fiscal year of June 1951 through May 1952, according to the American Potash Institute. This represents an increase of 7% over 1950-1951. Deliveries by the six leading American potash producers were well over any previous year and those of imported potash were higher than last year. The deliveries were made in 44 states, the District of Columbia, Puerto Rico, Cuba, Hawaii, Canada, and a few other countries.

Deliveries for agricultural purposes in the Continental United States amounted to 1,547,323 tons K₂O, a 9% increase over last year. Canada received 61,508 tons K₂O, an increase of 1%; Cuba 17,616 tons, an increase of 42%; Puerto Rico, 23,491 tons, a decrease of 22%; Hawaii, 14,173 tons, an increase of 3%; and other countries, 10,083 tons, a decrease of 19% compared to last year.

Illinois was the leading state for deliveries, followed in order by Ohio, Georgia, Virginia and Indiana. Deliveries do not necessarily correspond to consumption in a given state.

The 60% muriate of potash continued to be the principal grade, comprising 77% of the total agricultural potash delivered. Sulphate of potash and sulphate of potash-magnesia together made up 7% of deliveries; 50% muriate of potash 15%; while manure salts dropped to less than 1%, reflecting the trend toward the use of more concentrated materials.

Deliveries of potash for chemical uses amounted to 80,947 tons K₂O, a decrease of 8% under 1950-51. The 60% muriate grade made up 95% of chemical deliveries, and sulphate of potash 5%.

DELIVERIES OF AGRICULTURAL POTASH SALTS JUNE 1951-MAY 1952 In Tons of 2,000 lbs. K₂O

Point of Delivery	60% Muriate	50% Muriate	Manure Salts	Sulphates	Total
Alabama	54,417.38	9,679.53	44.00	1,993.71	66,134.62
Arizona	24.00	.....	.....	360.00	384.00
Arkansas	27,768.59	10,503.30	552.37	648.04	39,472.30
California	8,943.00	.....	.....	6,566.50	15,509.50
Colorado	844.30	25.00	.....	10.00	879.30
Connecticut	3,680.14	.....	.....	580.37	4,260.51
Delaware	5,607.83	51.00	.....	110.99	5,769.82
District of Columbia	121.46	.....	.....	.....	121.46
Florida	57,005.49	14,451.17	49.58	22,875.27	94,381.51
Georgia	75,677.92	32,998.92	469.97	7,384.97	116,531.78
Idaho	416.00	.....	.....	.....	416.00
Illinois	145,945.99	14,189.60	218.84	845.43	161,199.86
Indiana	89,259.16	4,874.90	.....	2,938.04	97,072.10
Iowa	22,508.79	786.75	.....	101.09	23,396.63
Kansas	1,765.35	30.00	509.19	.....	2,304.54
Kentucky	15,912.29	1,328.55	.....	8,260.54	25,501.38
Louisiana	19,183.44	15,848.33	.....	444.70	35,476.47
Maine	7,172.98	4,906.31	13.03	320.52	12,412.84
Maryland	50,439.12	26,849.71	21.88	4,233.52	81,544.23
Massachusetts	13,188.86	1,484.21	.....	865.04	15,538.11
Michigan	29,795.00	582.00	.....	110.81	30,487.81
Minnesota	28,853.00	434.00	.....	225.87	29,512.87
Mississippi	24,433.08	8,689.35	.....	72.47	33,194.90
Missouri	26,791.88	1,425.05	23.17	564.15	28,804.25
Montana	61.00	.....	.....	.....	61.00
Nebraska	1,055.42	.....	.....	8.80	1,064.22
New Jersey	25,194.73	411.00	.....	727.51	26,333.24
New Mexico	9.00	26.25	18.00	.....	53.25
New York	24,458.72	7,063.12	.....	798.16	32,320.00
North Carolina	58,216.49	19,163.70	93.21	16,825.85	94,299.25
North Dakota	1,532.90	20.00	.....	.....	1,552.90
Ohio	134,969.89	2,076.10	.....	5,381.49	142,427.48
Oklahoma	2,470.98	328.00	.....	19.05	2,818.03
Oregon	3,000.00	.....	.....	40.40	3,040.40
Pennsylvania	24,926.15	4,335.50	.....	1,260.73	30,522.38
Rhode Island	437.53	882.00	.....	56.10	1,375.63
South Carolina	36,528.45	21,676.51	307.13	4,673.73	63,185.82
Tennessee	51,128.90	3,545.95	24.00	4,133.05	58,831.90
Texas	24,039.63	1,114.60	33.29	352.61	25,540.13
Utah	343.00	.....	.....	21.00	364.00
Vermont	505.14	.....	.....	.....	505.14
Virginia	56,658.46	30,545.61	12.00	11,743.42	98,959.49
Washington	4,253.07	.....	.....	32.00	4,285.07
West Virginia	669.79	103.00	.....	.....	772.79
Wisconsin	36,647.34	1,501.00	.....	555.48	38,703.82
TOTAL U. S.	1,196,861.64	241,930.02	2,389.66	106,141.41	1,547,322.73
(IMPORTS)	(71,367.36)	(149,373.47)	.....	(17,811.15)	(238,551.98)
Canada	54,289.79	1,574.95	.....	5,643.74	61,508.48
(Imports)	(17,316.00)	.....	.....	(1,023.00)	(18,339.00)
Cuba	11,296.11	3,226.80	.....	3,093.54	17,616.45
(Imports)	(6,909.40)	(3,226.80)	.....	(1,761.54)	(11,897.74)
Hawaii	13,134.00	.....	.....	1,039.00	14,173.00
Puerto Rico	11,220.90	10,561.65	.....	1,708.16	23,490.71
(Imports)	(2,868.92)	(10,561.65)	.....	(910.66)	(14,341.23)
TOTAL INSTITUTE TERRITORIES	1,286,802.44	257,293.42	2,389.66	117,625.85	1,664,111.37
Exports	10,013.27	.....	.....	69.00	10,082.27
GRAND TOTAL	1,296,815.71	257,293.42	2,389.66	117,694.85	1,674,193.64
(IMPORTS)	(98,461.68)	(163,161.92)	.....	(21,506.35)	(283,129.95)

(NOTE: Figures in parentheses represent imports and are included in the totals immediately above them.)

CONVENTION ASSOCIATION OF AMERICAN FERTILIZER CONTROL OFFICIALS

Shoreham Hotel Washington, D. C.

Friday, October 3, 1952

Morning Session

8:30—9:30—Registration

Roll Call by States

Report of Secretary-Treasurer

Announcement and Appointment of Committees.

Address by President—J. F. Fudge, State Chemist
College Station, Texas

Address—Russell Coleman, President, National
Fertilizer Association, Washington, D. C.

Prospective Promotions for Plant Food—Paul T.
Truitt, President, American Plant Food Council, Inc.,
Washington, D. C.

Some Manufacturing Problems and New Develop-
ments in Fertilizer Technology—Edwin C. Kapusta,
Chem. Engineer, National Fertilizer Association,
Washington, D. C.

Polyelectrolyte Soil Amendments—Allen B. Lem-
mon, Chief, Bureau of Chemistry, Sacramento, Cali-
fornia

Report of States Relations Committee—H. J. Fish-
er, Chairman, New Haven, Connecticut

*12:30—LUNCH

Afternoon Session—2 P.M.

Bulk Fertilizer Distribution—Rodney C. Berry and
M. B. Rowe, Department of Agriculture, Richmond,
Virginia

Report of:

Model State Fertilizer Bill—S. B. Randle, New
Brunswick, N. J.

Executive Committee—G. W. Micheal, Ottawa,
Canada

Report of Investigators:

General Terms—M. H. Snyder, Charleston, Va.

Nitrogen Products (Organic)—M. P. Etheredge,
State College, Miss.

Nitrogen Products (Inorganic)—J. W. Kizmeski,
Amherst, Mass.

Phosphorus—J. F. Fudge, College Station, Texas

Potash—R. W. Ludwick, State College, N. M.

Calcium and Magnesium—W. B. Griem, Madison,
Wis.

Manganese—J. B. Smith, Kingston, R. I.

Boron—Rodney C. Berry, Richmond, Va.

Zinc and Copper—Gordon Hart, Tallahassee, Fla.
Mixing and Segregation—E. W. Constable, Raleigh,
N. C.

Registration Forms—John L. Monaghan, Topeka,
Kan.

Publications—Bruce Poundstone, Lexington, Ky.

Specimen Labels—F. W. Quackenbush, Lafayette,
Ind.

Tonnage Reports—G. H. Laramie, Concord, N. H.
Pesticides in Fertilizers—A. B. Lemmon, Sacra-
mento, Cal.

Specialty Fertilizers—E. A. Epps, Jr., Baton Rouge,
La.

Bulk Fertilizers—M. B. Rowe, Richmond, Va.

100,000 sq. ft. of Galvanized Roofing and Siding *protected against Acid Fumes!*

A year and a half ago, the C. O. Smith Guano Company, Moultrie, Georgia, rebuilt its huge plant that had been destroyed by fire. The owners had all galvanized roofing and siding coated with Bitumastic® No. 28—an extra-thick protective coating.

This tough coating provides lasting protection against weather . . . against corrosive fumes. It doesn't check or crack. It doesn't support combustion. We handle the complete line of Bitumastic Protective Coatings. See us for information.



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Kick the tires and hope for the best

The first car you bought. The world may have been yours as you rolled triumphantly on your way. Or perhaps your face was beet red as your best girl helped you push your investment the last part of the way home.

At your desk today, you place most orders by specification. You find quality control and performance tests useful safeguards. Still, conditions being what they are, too frequently you have to hope for the best.

What is your best protection? Probably you agree with other business men who were asked recently. These executives, who account for more than 85 per cent of all Multiwall bag purchases, spelled it out*: The reputation of the seller.

Union has been the acknowledged leader in paper packaging for 76 years. Multiwall buyers who specify Union know

their bags are being supplied by the company best qualified to help them develop a better package.

They have a further reason for confidence. Union's record of fair play.

Fair play in pricing. Fair play in allocating bags. Fair play in regarding delivery dates as pledges to be met.

This is the kind of treatment that has influenced knowing Multiwall users to place a greater share of their orders with Union.

It is the kind of treatment you can depend upon.

More so every day . . .

IT'S UNION FOR MULTIWALLS



*August, 1951 research study.

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Manufacturers of SULPHURIC ACID, SUPERPHOSPHATE, COMPLETE FERTILIZERS
and ALL TYPES OF BASE GOODS

EXPORT ORDERS SOLICITED

CONDITIONERS

(Continued from page 22)

proved workability, more favorable microbial relationships, faster germination, increased emergence, faster early growth, increased foot formation, improved drainage, decreased erosion, decreased crusting, and ultimately improved crop response, all come about as a result of the primary effect of aggregate stabilization. Only if this primary effect is produced to the necessary extent can the beneficial results—which add up to good tillage be obtained.

"The effectiveness of any soil conditioner, or the natural structure of any soil, may be determined by measuring the proportion of such aggregates which remain stable in the presence of excessive amounts of water. A standard procedure used for this purpose by soil scientists involves screening the soil sample through a series of sieves immersed in water and gently agitated for a fixed time. These data, expressed as per cent of the soil which is in the form of water-stable aggregates greater than one-fourth millimeter in diameter, may, if determined under exactly comparable conditions, be used to measure the effectiveness of a conditioner on a problem soil, to determine the

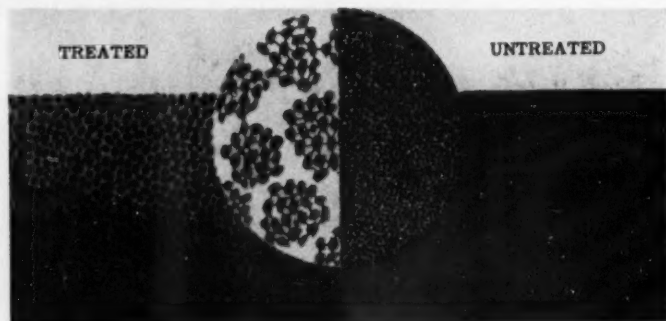


FIGURE 1. SCHEMATIC REPRESENTATION OF THE EFFECT OF SOIL CONDITIONERS IN STABILIZING AGGREGATES IN CLAY SOILS.

amount of conditioner necessary to produce a worthwhile degree of aggregation, and to compare the relative effectiveness of different conditioners.

"Conditioners stabilize soil structure but do not create it. In other words, a conditioner can only fix a soil in the state to which it has been converted by appropriate cultural practices. If the preparation has not produced a loose, porous seed bed with soil clusters of desired size, addition of a conditioner will not change this state of affairs. Since

conditioner is absorbed tenaciously by the soil, it must be placed where its presence is desired. Application of a solution of a conditioner to a hard, crusted soil will not cause aggregation or any change in mechanical condition of the crust, and may in fact stabilize the undesired condition. Thus, there is no royal road to riches, insofar as soil is concerned, and mechanical preparation is essential to good results. The job cannot be done with a garden hose from a comfortable position in a lawn chair."

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Phosphoric Acid

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Sprackets and Hercules Chain built for performance where corrosive action 'tests the metal'. May we hear from you?

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933 North Fourth Street, Columbus 16, Ohio

WITHSTAND SHOCK

Hard surface for wear and tough interior to withstand shock make Jeffrey Style A or AA Malleable

Buckets the logical choice. Also 'CHAIN-SAVER'



SAFETY

(Continued from page 52)

1. BULLETIN BOARDS

Safety posters can be purchased in quantity for use on plant bulletin boards. However, this type of poster usually falls into a pattern. A check with the employees in the plant the day after the poster has been changed will not reveal much identification. Workers form a habit of tuning out the standard poster just as they tune out the radio commercials.

Part of the reason for this lack of interest in the prepared safety posters is that they lack plant human interest. The people pictured on the poster are not known to the workers in the fertilizer plant. The scenes illustrated may be for an accident in a steel mill or a tire plant and lose value for the workers in a pesticide plant.

However, when this poster idea is changed to a poster of an accident in your plant, a photograph of one of your men who has an enviable safety record and the workers will read and remember the poster. It will have fertilizer plant human interest—your plant.

Commercial fertilizer and insecticide plants that have adopted this idea of posters make these recommendations:

1. Change the posters frequently—at least every two weeks.
2. Picture current accidents—not ancient history in the plant.
3. Have the poster tell the story—who, what, why, and how it could have been prevented.
4. Keep copy on posters at a minimum—people do not have time to read a long message.

2. PERSONAL LETTERS

Every time the safety record of a worker is reviewed it is suggested that the safe workers receive some kind of a personal letter from a top executive in the plant. This can be a short note of congratulations to each employee who has gone through the period—six months or a year—

without any accident.

These letters can follow a form yet made personal by a review of each individual's long standing safety record. If the employees received a safety letter a year ago, the letter should start something like this:

"Last year when I wrote you about your fine safety record I sincerely prayed that I would be able to send you another letter this year. You have gone two years without an accident! Congratulations, John."

Some fertilizer and insecticide plant managers have a more frequent system of writing to new employees. Statistics prove that new workers are more accident prone than older workers. Thus, new employees receive a letter when they start, after a month, three months, six months, nine months, and one year. After this time they are placed on the regular rolls.

Under this plan, employees who have had a serious accident receive letters of congratulations when they return to work, after a month, and again three months later. It is not because these workers need a reminder but they will talk safety at lunch, be more observant of other worker's unsafe practices, and be good trainers for new employees.

If the cost of preparing individual letters is too much for a fertilizer and pesticide plant, it is suggested that the letters be sent to the department for posting. This letter congratulates the entire department and can start a form of rivalry between the departments for the best safety record.

Rules to remember in using personal letters to promote safety are:

1. Don't use a mimeographed form letter—make it personal or don't send it.
 2. Tie in with past letter to make the congratulations more personal and sincere.
- ### **3. CONTESTS AND DRAWINGS**

Safety contests have been used in many fertilizer plants with a variety of results. If the contest is successful in keeping the accident rate at

zero for any period of time, the contest drags on for months. Employees tend to lose interest after a month and the value of the contest is lost.

However, if the the accident rate is particularly high in a fertilizer plant, the contest can be used for a short time to provide a stimulant to get things on an even keel. Then, after the contest has run for thirty days the awards can be made. This eliminates the long drawn out waiting and lack of interest than may develop.

Another form of contest that fertilizer and pesticide plants have found successful is to have a weekly safety drawing. Management puts up a weekly sum for safety—\$10, \$25, \$50, or whatever is in line with the number of employees in the plant and the seriousness of the accident rate. Each week the workers who have had 60 accident-free days in the plant are entered in the drawing.

After a worker has had an accident he must maintain a 60 day safety record before he can participate in the drawing. This keeps everyone safety conscious and ties in with the payroll pools that have developed in many plants.

A variation of this weekly drawing is to eliminate all workers in a department where there has been an accident. Everyone in the department suffers because one employee has failed to observe safety rules of the plant. Thus, safety is a topic of conversation, observation, and activity all the time.

Best results are obtained with the contests and drawings when these suggestions are followed:

1. Keep the time limit of the contest under thirty days.
2. Make the rewards worthwhile to build greater enthusiasm.
3. Post contest rules or name of drawing winner as soon as possible.
4. Emphasize safety in all activities connected with the contest or the drawing.

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4. SAFETY SUGGESTIONS

Workers in the fertilizer and insecticide plant know the accident areas. And, many of these workers have good ideas on how accidents can be avoided. Any system that encourages the employees to forward these ideas and suggestions to the front office will help maintain interest in the plant safety program.

Rewards for safety suggestions that can be adopted will encourage more people in the plant to participate. In addition to the cash reward for the suggestion, the thinking employee can be given extra recognition in the house magazine, on the plant bulletin board, and with a personal letter from top management.

Every safety suggestion submitted should be recognized in some way—interview or letter. This helps keep the ideas flowing and keeps the employees safety conscious every day in every way.

Here are four rules for handling safety suggestions that most fertilizer plans have found helpful:

1. Encourage everyone to give safety suggestions.
2. Discuss the suggestion for a complete understanding.
3. Act on the suggestion in some way.
4. Give credit where credit is due for the safety idea.

These four methods for promoting safety are by no means the complete list . . . they represent ideas that other pesticide and fertilizer plants have found helpful. Variations of

these ideas and other methods of promoting safety are all around any plant.

Fertilizer plants that want to maintain a low accident rate will find plenty of ways to remind workers and supervisors that **safety is everyone's problem—everyday!**

NFA Offers Trophies To County Agents

A new project to help promote the grasslands program has been launched by NFA, which is offering a trophy to the county agent in each state who contributes most to the cause during 1952. Each state sets up its own judging formula. Awards will be made December 1-3 at the annual County Agent Convention in Chicago.

NFA Builds Facts For Bankers

NFA is in the midst of a study to collect data on the financial returns from fertilizer and other sound practices so as to be able to report to bankers, landlords and others interested in the fiscal angle on plant foods.

Hudson Plant Gets Safety Award

The Palatka, Florida, Division of the Hudson Pulp & Paper Corp. was presented a special award by the American Mutual Liability Insurance Company in consideration of the fact that during the calendar year of 1951 this Hudson mill ac-

cumulated 729,963 man-hours of work without a lost time accident. The award was received for the company by J. L. Richardson, Resident Manager of the mill.

Geary Leaves Chemical Concerns


Robert J. Geary has resigned as president of Geary Chemical Corp., and vice-president of Chemagro Corp. in order to undertake research and development of farm chemicals on behalf of Farbenfabriken Bayer, Germany, with offices at Blue Point, Long Island, New York.

Lush Writes Pasture Book

Robert H. Lush, professor and dairy husbandman University of Tennessee College of Agriculture has written a book, "Pasture Production and Management" to be published soon by the Blakiston Company, New York.

Inspiration and material for the book came largely from ten years of dairy research in Louisiana, eight years as pasture specialist and agronomist with the National Fertilizer Association and more recently as a teacher and investigator in the Middle South. There are separate chapters on pasture management of each class of livestock, on irrigation, utilization for hay, silage, soil improvement and seed production, pasture pests, weed control and tests. Many illustrations, tables and pasture references are included.

The agricultural student and agronomist should find this a valuable book. It is the first in its field for the United States.



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Soluble plant-nutrient chemicals by Monsanto are being formulated into fertilizer solutions, providing direct feeding to plants of nitrogen, phosphorus and potassium without harm to leaf crops. Immediate solubility, when applied directly to plants, is a characteristic of solutions of Di Ammonium Phosphate, Mono Ammonium Phosphate, Mono Potassium Phosphate and Phosphoric Acid 75%. They also are available for dry applications.

Shipped in appropriate containers, these chemicals are being used by fertilizer manufacturers in processing specific formulations for soil dressing or direct-to-plant applications. Standard farm equipment is used for either spray or solid application. For information concerning this available supply of plant-nutrient chemicals, contact any District Sales Office, or write MONSANTO CHEMICAL COMPANY, Phosphate Division, 1700-C South Second Street, St. Louis 4, Mo.

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	N	P ₂ O ₅	K ₂ O
Mono Potassium Phosphate (Crystals)	—0—	51.6%	34.2%
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Mono Ammonium Phosphate (Crystals)	12.2%	61.61%	—0—
Phosphoric Acid (75.0%) (Liquid)	—0—	54.5%	—0—



SERVING INDUSTRY... WHICH SERVES MANKIND

MARKETS

ORGANICS: Interest in organics for fertilizer use is relatively tight except for fall and spring shipment. Domestic Nitrogenous producers are in a heavily sold position at prices from \$4.60 to \$5.00 per unit of Ammonia, bulk, f.o.b. production points. Imported Nitrogenous Tankage is offered in limited quantity for summer and fall shipment at around \$6.00 per unit of Ammonia, bagged, CIF usual Atlantic ports.

CASTOR POMACE: Current production Domestic Castor Pomace continues limited but supplies are available for summer and fall shipment at \$37.25 per ton in burlap bags or \$2.00 per ton less if in paper bags, f.o.b. Northeastern production points. Little interest in shown in Imported material.

DRIED BLOOD: Unground Dried Blood, bulk, is around \$5.75 to \$6.00 per unit of Ammonia in the Chicago area and \$6.00 to \$6.25 per unit in the New York area.

POTASH: Except the producer at Trona, California, whose price, effective July 15th, is 53¢ per unit K₂O, bulk, on Murite of Potash. Domestic producers are continuing to ship at last season's prices both Sulphate & Muriate of Potash. Movement is in seasonal volume. Imported Muriate of Potash is offered at the ports at 60¢ per unit exvessel to a price equivalent to buyer's delivered price from Carlsbad producers. Imported Sulphate of Potash is offered at around 94¢ exvessel.

GROUND COTTON BUR ASH: Material testing 38.42% K₂O is available from producers for prompt and future shipment. This material delivers at prices equal to, or less, than Domestic Sulphate of Potash but is primarily in the form of Carbonate of Potash.

PHOSPHATE ROCK: The market continues in relatively tight position with demand active and no excessive stocks on hand at the mines. Prices remain firm and unchanged.

SUPERPHOSPHATE: Demand for

normal Superphosphate continues active at ceiling levels. Triple Superphosphate is in excessive demand and supply relatively short.

SULPHATE OF AMMONIA: The prolonged strike at the Steel Mills has curtailed production of coke-oven material. Demand is relatively quite but loss of tonnage is expected to be felt acutely for new season's

GEORGIA GRADES

(Continued from page 41)

minimum plant food content of any grade to be 20 units per ton of mixed fertilizer containing the 3 major plant food elements (NPK).

C. Planning and initiating an educational program to be participated in by all interested Federal, State, Farm and Commercial Agencies.

3. That the Society request Hon. Tom Linder, State Commissioner of Agriculture to designate two men from the State Department of Agriculture to meet and work with the committee from the College of Agriculture and Plant Food Educational Society. It is suggested one of the men designated be the State Chemist and if possible the other person be the Commissioner himself.

4. That the Committee of this Society, to meet with, advise and assist the Committee from the College of Agriculture and the representatives of the State Department of Agriculture, shall consist of

A. The Executive Committee of the Society. (The Executive Committee is the President, the 4 Vice Presidents and the Secretary-Treasurer.)

B. A fertilizer industry production engineer or technician appointed by the President and approved by the Executive Committee.

5. That the members of the Society here assembled pledge their support to the educational program referred to above (Para. 2-B) by

A. Actively promoting the use of only those grades and ratios of fertilizer approved by the University and State Grades and Ratio Committee.

B. Discontinuing promotion of non-approved grades.

6. That the Society cooperate to the

needs. Prices remain firm and unchanged.

AMMONIUM NITRATE: Demand is far in excess of supply. At this writing one of the Domestic producers is still on strike and no Ammonium Nitrate is obtainable from that source. Prices remain firm and unchanged at \$63.00 to \$64.00 per ton, in bags, for Domestic production and \$72.50

(Continued on page 69)

fullest possible extent in acquainting the fertilizer manufacturers of this State with the recommendations of the Committee and seek active support of each company in carrying out the Committee's recommendations.

7. That copies of this resolution be sent to President Aderhold, Hon. Tom Linder, Dr. C. C. Murray, Dean and Director, College of Agriculture, President C. P. Donaldson, Abraham Baldwin Agric. College, President Zach Henderson, State Teachers College.

Upon passage of the above resolution, Dr. C. C. Murray, Dean College of Agriculture and Director Georgia Agricultural Experiment Stations, appointed the following committee: Chairman, W. O. Collins, Head Agronomy Department, Dr. Francis Johnston, Dr. Glenn W. Burton; S. A. Parham, Agronomist Coastal Station, E. D. Alexander, Extension Agronomist, Dr. L. C. Olson, head Soil Testing Laboratory, Georgia Experiment Station. The committee met immediately and discussed grades they would like to see used for the coming season, later presented them to all the agronomists of the University of Georgia System at a meeting July 28th. This group agreed to the list with the addition of one other grade, making a total of 13 grades. The following day Professor Collins requested the executive committee of the Georgia Plant Food Educational Society and one production engineer, and the state department of agriculture representatives and the state chemist to meet with them to get their opinion on grades to be recommended. The committee then presented the grades for discussion.

DEVELOPING NEW HERBICIDES

The Dow Chemical Company
By CHESTER E. OTIS

The need for chemical weed killers is established and accepted. Herbicides enable growers to handle weed problems otherwise uncontrollable; for example, the control of broad-leaved weeds in small grain and rice with 2, 4-D. Also, they allow the farmer to circumvent labor shortages and ever mounting labor costs; for instance, residual, pre-emergence control of weeds with DN in many large-seeded crops.

The chemical weed killer business has grown, in a few years, from an infant to a big boy. Fifteen years ago, we only had materials like sodium chlorate, borax, arsenicals, and carbon bisulfide for use primarily as soil sterilants. Today, we have these plus a large number of newer organics which have introduced us to a new concept of crop production

chemical weed control. True, this business, like any growing kid, sometimes almost drives the old through differential or selective man nuts but, with all its adolescent antics, it is growing and developing surely and rapidly.

There are, of course, many individuals and organizations responsible for this growth but, today, I'd like to discuss how chemical manufacturers can and do contribute to agricultural progress. Most specifically, would I like to trace the development of new herbicides. In so doing, I will draw on my own experience with The Dow Chemical Company but I think the pattern we follow is used, in general, by several other chemical companies.

First, let us look at the organization of a hypothetical agricultural chemical division. It takes many in-

dividuals in several groups or departments to plant the seed of an idea and nurture it to the flower of a product: Chemists to synthesize compounds and other chemists to formulate them into usable compositions. Biochemists, physiologists, biologists and other scientists perform exploratory research and screen compounds furnished them to determine their basic activity. Toxicologists study the possible hazards of chemicals to man and animal. Agricultural specialists, usually with a strong chemistry background, evaluate compounds in greenhouse and field tests, while similarly trained individuals extend the work to many areas. All of this must be integrated and coordinated very closely or the wastage and duplication would be suicidal. But, by and by, such joint effort results in a saleable product.

Now, let's look at our mythical organization in greater detail and see how it goes about its job.

In order to find or create new herbicides, we must know market

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needs and requirements. In other words, what kind of a weed killer does Mr. Farmer need and what must it do for him? We are seeking new uses for old products, new products for old uses, or new products for new uses.

Very important are those groups responsible for synthesizing, screening and determining of basic activity. When they have been apprised of market needs, they have several approaches to follow. They can proceed from known facts and, by intensively studying the problem, select or design compounds to fill the bill; or they can take a chemical showing some of the needed properties and synthesize various analogs (chemical brothers and cousins); or they can put all materials coming out of all company laboratories through regular screening programs which will pick out anything demonstrating desired activity; in this case, phytotoxicity. In actual practice, all three approaches are usually followed.

Let's say the cooperating synthesis and exploratory labs., through

the screening and problem approaches, have come up with a promising compound. Immediately chemical and physical properties, not already known, must be established. When this is done, all we still have is the property information plus the fact that Compound A has desirable biological activity. This is only the beginning of a long, wearisome trail.

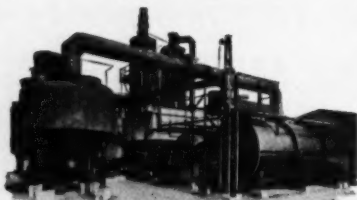
Next, the various analogs and derivatives must be made and explored. The first chemical can be compared to the hub of a wheel and the derivatives to the spokes. The wheel must be completed before we can proceed very far. Out of all this, we may find five materials worthy of further test. At this point, we don't know which one we will eventually choose, if any of them. One may be the most active but it may be almost as active but may depend on raw materials that are costly or in short supply. And so on. Research is not only a process of discovery but also of selection. We are continually evaluating and choosing. Mistakes must be made in

research and development, not in sales, and the earlier in research they are made, the better. It takes courage and balanced judgment for workers to kill, or carry on, one of their pet projects, but those decisions continually must be made.

Well, here we are with five compounds of potential application to a certain weed control problem. What now? We'd better call in the formulating and toxicology labs.

Formulating, at this time, is asked to do enough testing to develop compositions suitable for larger treatments. But as the compounds progress through various research stages, they will do more and more formulating. Their stock in trade are solvents, emulsifiers, wetting agents, corrosion inhibitors, sequestering agents, diluents, freezing tests, particle sizes and on and on. If and when a saleable product is finally developed, it is up to formulating to furnish production with specifications assuring a consistently uniform product that will perform satisfactorily under a wide range of use conditions. Because of

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the supply situation and the danger of not being able to obtain an essential ingredient, production wants two or three sets of specs which will enable them to change the formula without changing the product's performance in any way. An example of the complexity of their work is their standard for aging and storage tests, wherein they require aging data under a variety of conditions for a year before releasing a product for sale.

Early in the game, toxicology need furnish only preliminary data on the effect of the specified compounds on warm-blooded animals. This is necessary to protect and guide those researchers who will be concerned with the additional evaluation studies. However, as with the formulators, toxicologists must conduct continuing and expanding tests as compounds near the late research, development and marketing

stages. Before a product is ready to market, they must have determined the degree, if any, of its acute and chronic toxicity and answers to such questions as these: Is it absorbed through the skin? Is it irritating to the skin? To the eyes? Is it accumulated in the body? If it is poisonous, is an antidote desirable? If so, what? And, of course, many more. Their labs are well stocked with white rats, guinea pigs, rabbits, dogs and monkeys because they use many thousands of these a year. I think you can readily see why it is not hard to tie up \$25,000 in toxicology tests alone before a compound ever reaches the market as a saleable product.

But we had better get back to those five compounds or we will never have anything to sell. We know they are worthy of more study, so our first step is to establish greenhouse and postage stamp-

size field plots. These are set up to tell us such things as their relative effect on several representative species of plants, both weeds and crops; their mode of action, that is, are they absorbed by the plant? If so, by aerial portions or by roots? And are they translocated? Also the tests should tell us if the chemicals are held in soil or if they decompose or leach readily and so on. As you can see, our work at this stage is aimed at developing basic principles and not at controlling, say, hollyhocks in a Massachusetts's cranberry bog.

Our data from these first evaluation tests are gathered and now comes a crisis in the lives of our compounds. It is time to decide if they should continue at the center of attention and maybe ultimately develop into glamour babies—really hot sales items—or should they be put on the shelf, perhaps to re-

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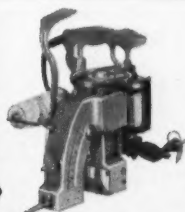
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main forever or, as sometimes happens, to wind up in some other entirely different use.

A conference is called. The chemists, biochemists, toxicologists, formulators, etc. gather to pool information and determine future action. First, what does the evaluation data tell us? Immediately we'll say, two of the five compounds are ruled out because their activity is of too low a magnitude. Of the remaining three, one is eliminated, perhaps because the toxicologists say it is a nasty one to handle and could be a potential trouble maker to producers and users. In some cases, we might take the two left on further before deciding in favor of one but let's say the chemists tell us now that one of them will be difficult and costly to make and, for those reasons, is definitely inferior to its mate. So, after considerable review, we think we have one chemical with a satisfactory performance record to date and with satisfactory chemical, physical, toxicological and formulation properties, and one that probably can be produced at a reasonable cost from available raw materials.

Now, we shift from low to second gear. The chemists go back and step-up their process research. More often than not, process—the reactions necessary to produce a chemical—is the key to success or failure in the chemical business. A good process, simple, reliable and cheap to operate, and giving a high yield of the desired compound, can keep a manufacturer ahead of his competitors for a long time; but a poor one can put him out of business. Following the development of

a satisfactory process, a pilot plant is built. This serves two purposes: It furnishes sufficient quantity of chemical for widespread experimentation, and enables additional process research.

The others go back to their respective labs, each expanding his own phase of the operation. The toxicologist applies more treatments to his guinea pigs, in replicated series. The formulator concocts all sorts of witches' brews and initiates his corrosion and aging tests. The field researchers, heretofore not too important participants, come into their own. They set up extensive field tests to learn all they can about dosage, timing, spray volume, method of application, specificity of crops and weeds, effect of environments, including soil, performance of formulations and many other things that need be known.

Also, at this same time, the development group enters the picture. It evaluates the compound under many conditions to supplement the knowledge gained by the other groups. Then, too, it offers the material, along with the available technical data on chemical and physical properties, toxicology, principles of use and suggested methods of use, to federal, state and private experiment stations and extension people interested in working with it. This latter step is an all-important one because no product can attain a wide market without the evaluation afforded by the cooperating experimental groups. They can point out weaknesses or areas of usefulness not realized before, and they can determine whether or not the chemical has a place in a given

locality. Without the contributions by those who are public employees and, in effect, work for the farmer, it is safe to say there would be very few chemical weed killers today.

There has developed through the years a fine relationship between various public agency workers in agriculture and chemical manufacturers. These groups, by pooling knowledge and joining their efforts, have developed many answers to a wide variety of problems. Thus, benefit has accrued not only to the chemical industry but to agriculture and our whole economy as well.

While all of this is going on, the development group also undertakes a market study. What is the market? How extensive is it? Where is it? How can it best be sold? What sort of an educational program is needed? Is special application equipment necessary? These are the sort of questions that must be answered.

If, as a result of the foregoing hustle and bustle, the positive results sufficiently outweigh the negative ones, it may be decided to put the product on limited sale. That is, it may be sold in a few areas under close control to learn how it performs on the farm which, after all, is the real proving ground. At this stage the chemists and chemical engineers together may design and build what is called a semi-plant. This will produce material for the limited sale program and function as a pilot plant for major production facilities to be built later, if large-scale manufacture is warranted.

Finally, comes the big question. Is the product good enough to produce and sell on a national market? All



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of the research, development, production and sales people pool their information and thinking. This is the last fork in the road for our pride and joy we have worked so hard over. If the answer is no, it dies. If the answer is yes, a report with recommendations goes forward to top management. The product is not yet past that last fork in the road. Management has other reports and recommendations on its desk. Other people in the company have desirable projects, too, and they are competing with us for the capital and raw materials necessary to construct and operate a manufacturing plant. But we'll say ours wins out.

Now, we're almost in business, but not quite. The product must be registered with the various federal and state regulatory agencies. Labels must be written and printed, as must literature. These tell what the product is, what it's for, how to use it and how not to use it. Sales promotion material and advertising are scheduled and prepared. Necessary demonstrations and customer service are planned.

At last, the sales curtain rises. If our collectively gathered facts are true and if our thinking is sound, our product should be successful.

It has taken less than twenty minutes to trace the course of our hypothetical weed killer for you whereas, in actual practice, it usually takes two to five years to develop a new product from scratch. That's quite a gestation period. And, believe me, no mother ever suffered more severe labor pains than are

suffered by a chemical manufacturer in bearing agricultural chemical babies. And we're just as proud of them after they are born as mothers are of theirs.

MARKETS

(Continued from page 64)

per ton for Canadian material.

NITRATE OF SODA: Imported material is now in relatively comfortable supply and the market is in good balance. No recent change in price has been noted.

IMPORTED CALCIUM AMMONIUM NITRATE: None of this material is currently being imported but supplies are expected to be brought in probably in the early spring.

GENERAL: Fertilizer manufacturers are primarily concerned in preparing for the new season. Potash appears to be in ample supply but shortages of Nitrogen, particular Sulphate of Ammonia, threatens on account of strikes at producing centers. Superphosphate production continues active and demand strong.

Sulphur IAC Asks 60-Day Inventory

The Native Sulfur Industry Advisory Committee July 30 unanimously recommended to the National Production Authority, Department of Commerce, that the agency raise its present 25 calendar day inventory limitation on sulfur supplies to 60 calendar days.

Sulfur inventories presently are limited to a 25-day supply at cur-

rently scheduled rates of operation under an amendment to NPA's Sulfur Order, M-69, issued November 9, 1951. The 25-day limitation, however, permits barge or vessel shipments which may amount to as much as a three or four month supply providing no additional deliveries are received as long as inventories exceed requirements by 25 calendar days.

Kellogg Receives New Zealand Award

Dr. Charles E. Kellogg, chief of the soil survey division, Agricultural Research Administration, U. S. Department of Agriculture, was honored at the New Zealand Embassy July 28, when Ambassador Leslie Knox Munro presented him with a carved Maori box. The gift, from a group of soil scientists in New Zealand, was in recognition of Dr. Kellogg's great interest and help to the soil scientists of that country.

During the past 15 years Dr. Kellogg has gained recognition as a world authority in soil science, especially in soil classification and geography. Within the past few years he has studied soil problems and made recommendations for soil research and land development in England, France, Italy, Greece, Yugoslavia, Austria, Czechoslovakia, Germany, Russia, Siberia, North Africa, the Belgian Congo, Egypt, Iran, Canada, Mexico, Australia, and New Zealand. He visited New Zealand in 1949.

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